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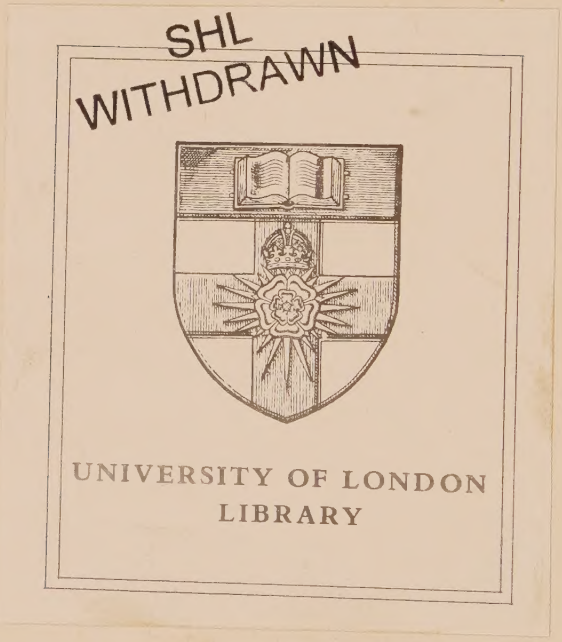

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ABBREVIATIONS

Ja January	My May	S September
F February	Je June	O October
Mr March	Jy July	N November
Ap April	Ag August	D December

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SPECIALIZATION AND CO-OPERATION IN THE INDUSTRY OF THE EUROPEAN COUNTRIES OF THE PEOPLE'S DEMOCRACY

N. S. Semin

*Byulleten' tekhniko-ekonomicheskoi informatsii, 1960 (8) 73-76

The socialist countries are at present producing more than one-third and in 1965 will produce more than half of the world industrial output. In the European socialist countries, according to a preliminary estimates, the production of electric energy per capita amounts to 1600-1700 kWh, coal - approximately 5500 kg and steel-275-300 kg (1). Machine building production will increase considerably.

An important measure for successfully solving these tasks is a more thorough socialist international division of work. The higher forms of the division of work are the interstate specialization and the co-operation in industry.

Joint work on recommendations for specialization is carried out according to the directives of the SEV (Council of Economic Mutual Aid), taking into account the historical and economic conditions, the possession of raw materials and experience of production as well as the requirements in the given type of product. For this reason, the possibility of production of identical articles simultaneously in several countries is not excluded.

*L. L. U. shelf mark: R00241. Holding: 1958 (1) -

Decisions are taken by the SEV about the specialization in the basic industries, and in the first instance in the mining, electric power, metal working and chemical industries. Thus the 10th session of the SEV discussed the problems of specialization and co-operation in the fields of plastics, synthetic rubber, artificial fibres, fertilizers and the production of rolled stock.

At the 11th session, problems in developing a raw material and an electric power basis were discussed as well as the specialization in machine construction. A whole series of problems, concerning the increase of ore mining, specialization of production of the more important types of chemical equipment, certain types of machinery and equipment for the sugar, meat processing and paper industries, were dealt with during the 12th session.

The main attention was given to the unification and co-ordination of the effort by the states participating in the SEV with a view of developing the mining industries.

Such industrially developed states as the German Democratic Republic and Czechoslovakia direct their efforts to the production of more complex machinery than that of the other people's democracies. Having taken into consideration the insufficient raw materials and metallurgical basis, Hungary and the German Democratic Republic specialize in the production of articles which require a comparatively smaller weight of metallic components but more effort.

In accordance with the accepted recommendations Bulgaria, for instance, is developing agricultural and food processing machinery production as well as the production of a number of types of lathes and equipment for light industry.

Hungary specializes in the manufacture of equipment for the bauxite production, food processing equipment, the development of electro-technical production and lathes.

The German Democratic Republic will produce lathes, press-tools and textile equipment as well as equipment for the chemical industry; the ship-building and car industries are also being developed.

Poland is increasing the output of mining and mine equipment, and ship-building; the output of transport machinery and of a number of types of lathes is also being increased.

In Roumania the production will be developed mainly of equipment for the extraction and processing of crude oil as well as transport and agricultural machinery.

Czechoslovakia specializes mainly in heavy machine building, manufacture of power generating equipment and complex lathes and also in the production of forging and chemical equipment.

The output of coal production will be further increased in Poland and Czechoslovakia. These countries will develop mainly the production of coking coal. They will increase the supply of coal and coke to the German Democratic Republic Hungary and other countries. In order to speed up the development of this branch of industry, Poland will receive help from Czechoslovakia and the German Democratic Republic, in the form of deliveries of the equipment on credit. Thus, Czechoslovakia gave credit to a total of 250 000 000 roubles and the German Democratic Republic to 400 000 000 roubles.

Poland and Czechoslovakia will develop their ferrous metallurgy relying on their own resources and on a large supply of iron ore from the Soviet Union.

The extraction of ferro-nickel and chrome ores in Albania will be increased; Albania will also receive help from Czechoslovakia in the form of equipment supplied on long-term credit terms. The deliveries of ferro-nickel ores from Albania are already taking place. The extraction of bauxite in Hungary, on which is based the production of aluminium in the German Democratic Republic and Czechoslovakia, will be increased considerably.

In Roumania the extraction of crude oil and natural gas will be increased. This gas has been supplied since 1959 to Hungary through a newly built pipe line. The Soviet Union is the main supplier of crude oil to Poland, the German Democratic Republic, Czechoslovakia and Hungary. In 1965, the USSR will supply Poland, the German Democratic Republic, Czechoslovakia and Hungary with 15 000 000 t of crude oil(2). In connection with the increasing supply of crude oil to these countries in 1961-1965, a pipe line is being laid, by joint effort, from the Volga region. The supplies of crude oil ensure the raw material for the chemical industries of these countries and also improve their fuel balance.

The growing output of zinc ore in Poland and the development of rich deposits of lead and copper ores in Bulgaria are of great importance for the non-ferrous metallurgy of the socialist countries. It is anticipated that Poland and Bulgaria will increase the output of ores to such an extent that not only will their own requirements be satisfied, but supplies will become available for export.

In the chemical industry, too, there is specialization and unification of effort.

In Poland, with the help of Czechoslovakia which is supplying the required equipment on credit, there are increased efforts in mining

sulphur. The discovered deposits, which estimated as pure sulphur amount to approximately 100 000 000 t, place Poland second in the world after Mexico in sulphur reserves. Due to the co-operation with Czechoslovakia, the output of sulphur in Poland is being rapidly increased and in 1961 will reach approximately 100 000 t[3].

Apart from production in the USSR, soda ash will also be produced in the German Democratic Republic and Poland. The production of aromatic hydrocarbons will be concentrated mainly in the USSR, Czechoslovakia and Poland, and the production of potash fertilizers - in the USSR and the German Democratic Republic.

Chemical products having a particularly wide application (such as sulphuric acid, chlorine, ammonia, certain types of plastics, rubber products, etc.,) will be made in all countries.

In order to avoid duplication and to increase productivity, a division of production programmes as well as a standardization of the profiles of rolled iron is being carried out.

The rolling section of the SEV has compared the productivity in rolling various profiles in the SEV member countries, and approved various recommendations for the specialization of production based on this information.

For instance, the productivity (t/h) for H - beam No. 8 is: 8 in Roumania, 5.7 in Poland, 12.8 in Czechoslovakia and 10 in Hungary. The demand for this profile in Hungary is small in comparison with that in the remaining countries, but owing to the high productivity in Hungary, this country was recommended to carry on with the production of the profile taking into account the demand by other countries (where its production will cease).

At the same time H - beam No. 16 is being produced in Czechoslovakia at a much higher productivity than in other people's

democracies. For this reason Czechoslovakia will not only satisfy the home market for this profile but also the demand by other countries. Poland, on the other hand, has a higher productivity for profiles No. 18 and No. 20 and will therefore, supply them to other countries (except Roumania)[4].

In the preparation of such recommendations the cost of transportation is taken into account and therefore in some cases such a principle* does not apply, and a more narrow territorial specialization is established. Thanks to the division of the production programmes, the output of rolled stock in the European people's democracy increased, in its early stages, by 270 000 t per annum.

The SEV member countries are carrying out work in accordance with the approved recommendations on unifying their power supply systems and on the joint construction of electric power stations.

It is anticipated that in 1959-1964 connecting 220-kV transmission lines (and higher voltage lines) will be constructed to link the German Democratic Republic and Poland, Czechoslovakia and Hungary, Roumania and Czechoslovakia, Hungary and the West Ukrainian system of the USSR. The possibility of constructing other connecting power transmission lines is being studied.

According to the estimates made by experts, a saving of approximately 500 MW of electric energy will result, idle generating capacity will decrease, the reliability of the electric power supply will increase and a more effective utilization of the power produced to cover the irregularities in the load curve will also result[5].

With the help of fraternal countries, a large electric power station operating on natural gas will be errected in Roumania and 2 000 000 MWh of electric energy will be supplied to Czechoslovakia.

*i.e. productivity alone - Ed.

Bulgaria, Hungary, Roumania and Czechoslovakia have agreed on co-operation in the complex utilization of the energy of the Danube. In this connection the preparatory work has begun on the preparatory work on the construction of the Nagymaros power station, this being the first one in the Bratislava-Nagymaros sector. This station will supply electric power to Hungary and Czechoslovakia.

The co-ordination of effort in other branches of industry is also under way. Roumania, Poland, Czechoslovakia and the German Democratic Republic are building jointly in Braila a large cellulose-paper combine. This combine, which will be commissioned in 1960, will produce, from cane, cellulose, fibre, paper, cardboard and furfurol*.

Co-operation in the development of the raw materials branches of industry leads to their speedy growth, since at the present time the individual countries would be unable to ensure the necessary capital investments and supplies of equipment. Apart from this, the possibility exists of equalizing capital investments since, as is known, raw materials branches absorb more capital than the processing branches, and the time required in their construction is usually long.

In the field of machine building, where the variety of products is particularly large, co-operation and specialization are of the greatest importance.

The production of the basic forms of equipment is divided between the countries, according to recommendations made by the SEV as follows:

Metallurgical equipment. Light mills are being produced mainly in Poland and the German Democratic Republic, heavy mills in the USSR and Czechoslovakia, and drawing mills in Hungary and

*sic. - Ed.

the German Democratic Republic.

The production of blast furnace equipment will be carried out in the USSR, Poland and Czechoslovakia, whilst production of equipment for the aluminium industry in Hungary and the USSR.

Power supply equipment. It has been recommended that steam turbines with a capacity up to 50 MW be produced in the USSR, the German Democratic Republic, Czechoslovakia, Poland and Hungary, with a capacity up to 100 MW in the USSR, Czechoslovakia and the German Democratic Republic and above 100 MW in the USSR. The German Democratic Republic will produce high parameter steam boilers and high pressure vessels for the chemical industry. Water turbines will be produced mainly in the USSR and Czechoslovakia.

Goods vehicles. Vehicles with a load capacity of up to 1 t will be produced in the German Democratic Republic, with a capacity from 1 to 3.5 t in the German Democratic Republic and Poland, and over 5t mainly in Czechoslovakia.

Machine tools. Bulgaria will be engaged mainly in production of lathes. The total number of types of metal working lathes produced in Bulgaria is being reduced from 25 to 13.

Hungary specializes mainly in the production of single-stand vertical boring machines, complex lathes and certain other types of machine tools. The number of types produced is being reduced from 20 to 16.

The German Democratic Republic will concentrate on the production of precision lathes, gear cutting machines, honing and copy-milling machines. The number of types produced is being reduced from 64 to 56.

Poland is reducing the number of types of lathes produced from 40 to 35. She will specialize mainly in the production of vertical

cylinder-and-cone grinding machines and gear grinding machines.

Roumania is reducing the number of types of lathes from 14 to 6, at the same time she will concentrate mainly on the production of cantilever milling machines as well as transverse planing and planing machines.

In Czechoslovakia the number of types produced is being reduced from 62 to 42. In her production programme are retained horizontal boring lathes, combined and special lathes, as well as machines with programme control, etc. (6)

In addition, there is specialization in the manufacture of machine tools for the bearings industry. The Soviet Union will produce 55 types of such machines, the German Democratic Republic - 40, Poland -12, Czechoslovakia - 10.

It has been estimated that the net cost of the production of special machine tools for the bearings industry will be reduced, due to the elimination of duplication and an increase in production runs, by approximately 20%.

Specialization will also affect other types of industrial equipment. For instance, the production of mine drilling equipment and, equipment for crude oil processing is being developed in the USSR and Roumania. The production of chain-bucket excavators has been recommended for the German Democratic Republic and Czechoslovakia.

The production of equipment for cement factories with the capacity of furnaces from 1000 t/day is concentrated in the USSR and the German Democratic Republic, whilst with the capacity up to 800 t/day in Czechoslovakia, and with the capacity up to 450 t/day in Roumania. There has also been a division of the production programmes in ship-building.

At the same time a unification of equipment produced by the socialist countries is being carried out. For instance, instead of the present 42 different types of locomotives, it has been decided to produce in future only 27 types. The number of types of machines for the coal industry is being reduced by 77% and for the cement industry by 42%.

These measures result in a great economic effect. It has been estimated that the co-ordination of the projects in the field of boiler and turbine construction alone saves approximately 6500 man-months. In the design work in the field of rolled stock about 40-50% of the working time or approximately 12 000 man-months will be gained[7].

Still larger economies, due to the longer production runs and the possibility of applying a more progressive technology, will be achieved in the manufacture of machine construction components.

The programme of specialization envisages an optimal realization of the co-operation between the SEV member countries in the production of individual components, units and sets. For instance, Bulgaria has concluded an agreement with Czechoslovakia concerning the production of electric motors, the Soviet Union and Czechoslovakia will supply Poland with units required for marine diesel engines, co-operation is being established between chemical factories of the German Democratic Republic and Czechoslovakia, and so on.

All these forms of co-operation are reflected in long-term agreements among SEV member countries regarding mutual deliveries.

An ever increasing importance attaches to the division of effort in the field of scientific research. The corresponding organizations of the USSR and the people's democracies share among them the

efforts in research and common development of the most important problems. In consequence, research times are being reduced, there is saving in effort and the experimental base is being put to a better use.

The leading part, in solving the tasks of specialization and co-operation in industry, is played by the Soviet Union, which gives great help to the people's democracies in the course of realizing the co-operation with them.

Such brotherly co-operation, based on the division of effort, leads to a speedy development of individual countries as well as the whole socialist camp, to economy of effort and resources, to a more complete use of the advantages of the socialist system of economy.

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*Translation in: Problems of Economics, 1959 2 (4) 75
(L. L. U. shelf mark: R021692)

**Translation in: Problems of Economics, 1960 3 (2) 44
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TRAINING OF INDUSTRIAL-AUTOMATION ENGINEERS*

V. L. Lossievskii

**Avtomatizatsiya proizvodstvennykh protsessov, 1960 (3) 97-101

Specialized courses on "Automation and Telemechanics", "Electrical instruments", etc., held in a number of technical colleges were started so long ago that today they fail to meet present-day requirements created by the large-scale development of instrument manufacture and the automation of our national economy resulting from the resolutions adopted by the 21st Congress of the CPSU.

The main shortcoming of the present system lies in the emphasis given to instrument construction and the almost complete lack of courses on subjects needed for the training of engineers for the automation of production.

In future therefore, the training of automation engineers in technical universities should cover "Automation of Production Processes" - as well as the "Technical Means of Automation and Telemechanics".

Most production processes can be divided into two large groups: 1. Batch production e.g., (products of the engineering, electronic, electric-lamp industries), and 2. Flow production of solid, liquid, or gaseous products (e.g. the chemical, petroleum, building materials, foodstuffs, industries).

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*Published for discussion.

**L. L. U. shelf mark: R00007 Holding: No. 2 (1958), No. 3 (1960)

The production processes of these two groups show considerable differences both with regard to production methods and equipment and the methods and means of automation. For this reason the study of "Automation of Production Processes" should be divided into two: 1. "Automation of Continuous Production" and 2. "Automation of Batch Production.

Owing to the great variety of processes in both groups it is advisable to select a typical and sufficiently large industry in each group around which the course can be planned in accordance with its particular requirements. Machine construction can be adopted as the best basis for the "Batch Production" course both because of its size and because it is typical for the group. Almost any representative manufacturing process from chemical technology could be adopted as the basis for the "Automation of Continuous Production" .

The instrumentation field must also be subdivided because the extent of the instrument industry has made it impossible for a specialist trained as a general instrument designer to cover all the varieties of modern automation equipment. We feel therefore that the study of "Instrumentation" should be sub-divided as follows: a. "Electrical Automation Equipment" (instruments, regulators, and telemechanical devices): b. "Mechanical, hydraulic, and pneumatic devices and control equipment"; and c. "Mathematical devices and computers, etc", with an emphasis on the basic subjects necessary for the training of designers and operators. We shall not, however, consider here the details of syllabuses for these subdivisions.

The proposed list of subjects for the study of the "Automation of Production Processes" aims at the provision of an adequate general and specialized knowledge which would facilitate the independent designing, calculation and investigation of automatic control systems

for the processes of the relevant group, with the latest advances in science and technology taken into account. This structure corresponds in general outline to that adopted by the technical colleges for the training of specialists.

In general subjects such as physics, the technology of metals, the theoretical basis of electrical engineerings, the theory of mechanisms and machines, electrical machines, etc., a special emphasis should be placed on the sections needed for the main items of the course, while sections not directly concerned with it should be discussed in more general terms. The suggested programme provides for a number of subjects which have not been prescribed before but which are now necessary for the training of qualified "automation engineers".

The proposed course in the "Automation of Continuous Production Processes" includes new(underlined)subjects, while some existing subjects have been extended:

1. Fundamentals of Chemical Technology which replaces General Chemistry. The object of this subject is to provide information on the basic processes of chemical technology in order to facilitate the later study and analysis of the chemical processing equipment.

2. Production Processes and Equipment which considers the plants earmarked for automation with their static and dynamic characteristics, and the problems of the intensification* of processes and preparation for their automation.

3. Modelling considers the theoretical basis and the means of physical and mathematical modelling as one of the principal means of experimental investigation of objects and of the control system needed to make their operation automatic.

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* i.e. serving to increase production - Ed.

4. Mechanization of Production Operations considers the ways and means of mechanization of loading, unloading, metering, grading and sorting, packing, transportation, and other operations.

5. Fundamentals of the Theory of Operations are considered from the point of view of their use for example in closed loop automatic control systems.

6. The Theory of Automatic Control is supplemented by a section which considers the regulation of plants with inter-linked quantities, principles of on-off regulators and of self-regulating systems.

7. Automatic Inspection Equipment, including the use of modern means of continuous inspection (radioactive isotopes, ultrasonics, infrared radiation, mass spectrometry, quality control, etc.).

8. The Design, Assembly, and Setting of Automatic Systems covers questions of classification and identification of typical production plants, of selecting the parameters for the automatic control of the process, of the breaking-up of the design into stages, and the necessary technical documents, of standard solutions of automation problems, of special features of assembly and methods of adjustment, of the optimum setting of automatic controllers, etc., and of the determination of the reliability of an automatic control system.

9. Organization and Planning of Industrial Plants and the Economics of Automation also include the problems of rational planning in plants, the calculation of the effectiveness of automation, its priority and extent.

The suggested syllabus for the study of the "Automation of Batch Production"includes the following new (underlined) subjects, while those already existing have been extended:

1. The General Theory of Automatic Machines considers the

theoretical basis of the design of automatic machines and the choice of appropriate kinematic systems, drives, etc.

2. Hydraulic and Pneumatic Drives considers the basic principles of the theory, design and purpose of drive and actuating mechanisms.

3. Automatic Inspection of Components considers the methods and equipment of inspection and sizing of parts during the manufacturing process, resetting devices, etc.

4. Automatic Machines and Flow Lines considers the fundamental principles of production equipment - the object of automation - with the view to increasing its output and modifying it for automatic operation.

5. Mechanization of Production Operations, see above.

6. The Automation of Assembly Operations examines ways and means of automation of the assembly of articles, for example, the use of printed circuits in the assembly of products of the electronics industry.

7. Automatic Regulators and Copying Systems considers systems and automatic devices of copying machine tools, programme-controlled machine tools, and also of the automatic regulators most frequently used in the manufacture of various articles.

8. Fundamentals of the Theory of Operations, see above.

9. Design, Assembly, and Setting of Automatic Control Systems - design of automatic flow lines and shops, breaking-down of the design and the preparation of technical documentation, assessment of the reliability of automatic systems, special features of the assembly, principal methods of setting etc.

10. Organization and Planning of Plants, Economics of Automation, see above.

The syllabuses for both courses should provide ample opportunities for the study of the feasibility of use of computers in automatic production processes, the design of self-regulating systems of automatic control, automatic data processing, etc.

The syllabuses given below are compiled on the basis of the curriculum of the Moskovskii energeticheskii institut (Moscow Power Institute) for students specializing in automation and telemechanics. They provide a course of 5000 hours as prescribed by the Ministry of Higher Education of the USSR in 1959. Both contain a wide range of subjects on electrical engineering, electronics and computers - the knowledge of which is indispensable for an automation engineer if he is to make full use of the latest advances in science and technology.

The reorganization of higher education, aiming to bring it closer to actual production, will raise the standard of training of engineers and provide industry with highly qualified automation specialists.

Syllabus of Course in the Automation of Production Processes

Course A:

"Automation of Continuous Production"

		hours
1.	Fundamentals of Marxism-Leninism	250
2.	Political economics	140
3.	Foreign language	170
4.	Physical training and sport	136
5.	Higher mathematics	500
6.	Physics	208

		hours
7.	Fundamentals of chemical technology	108
8.	Descriptive geometry and drawing	208
9.	Theoretical mechanics	136
10.	Strength of materials	60
11.	Technology of metals	96
12.	Theoretical basis of electrical engineering	208
13.	Fundamentals of the theory of electric circuits	140
14.	Electrical machines	72
15.	Electrical materials	36
16.	Production processes and equipment	136
17.	Fundamentals of automation and telemechanics	80
18.	Elements of automation and telemechanics	136
19.	Fundamentals of electronics	170
20.	Pulse electronics	48
21.	Fundamentals of computers	140
22.	Theory of automatic control	172
23.	Fundamentals of automatic electric drive	72
24.	Modelling	72
25.	Automatic control devices	136
26.	Automatic regulators and copying systems	96
27.	Mechanization of production operations	64
28.	Automatic protection	48
29.	Theory of relay-contact circuits	72
30.	Telemetering systems	80
31.	Remote control	80
32.	General theory of communication channels	64
33.	Fundamentals of the theory of operations	52

		hours
34.	Design, assembly, and setting of automatic control systems	136
35.	Organization and planning of industrial plants; economics of automation	72
36.	Industrial safety and fire prevention	36
37.	History of technology	48
38.	Typical calculations (seminar)	226
39.	Laboratory work	300
	Total	*5000

Course B:

"Automation of Batch Production"

		hours
1.	Fundamentals of Marxism and Leninism	250
2.	Political economics	140
3.	Foreign language	170
4.	Physical training and sport	136
5.	Higher mathematics	500
6.	Physics	208
7.	Descriptive geometry and drawing	208
8.	Theoretical mechanics	136
9.	Strength of materials	64
10.	Technology of metals	204
11.	Theoretical basis of electrical engineering	208
12.	Theory of mechanisms and machines	170

*Sic. Total is 5004 -Ed.

		hours
13.	Electrical machines	72
14.	Electrical materials	36
15.	Fundamentals of automation and telemechanics	80
16.	Elements of automation and telemechanics	136
17.	Fundamentals of electronics	170
18.	Pulse electronics	48
19.	Fundamentals of computers	110
20.	Theory of automatic control	112
21.	Hydraulic and pneumatic drives	72
22.	Theory of automatic electric drive	72
23.	Automatic inspection of components	136
24.	General theory of automatic machines	80
25.	Automatic machines and flow lines	136
26.	Mechanization of production operations	64
27.	Automation of assembly	72
28.	Automatic regulators and copying systems	96
29.	Telemetering systems	64
30.	Remote control	72
31.	Automatic protection	48
32.	General theory of communication channels	64
33.	Fundamentals of the theory of operations	52
34.	Design, assembly, and setting of automatic control systems	136
35.	Organization and planning of industrial plants; economics of organization	72
36.	Industrial safety and fire prevention	36
37.	History of technology	48

	hours
38. Typical calculations (seminar)	226
39. Laboratory work	300
Total	*5000

*Sic. Total is 5004 -Ed.

DEVELOPING SCIENTIFIC LINKS WITH AFRICAN COUNTRIES

Anon.

*Vestnik Akademii nauk SSSR, 1960 (10) 97

A co-ordinating council on the study of Africa is being set up at the Presidium of the Academy (of Sciences of the USSR) to co-ordinate the scientific work of the institutions of the Academy on Africa and to promote the development of links with the countries of Africa. This council is to co-ordinate scientific research being carried out in the institutes of the Academy, work our proposals on scientific co-operation with the countries of Africa, and prepare complex scientific research expeditions into these countries.

The composition has been approved of the co-ordinating council with Academician K. V. Ostrovityanov** at its head.

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* L. L. U. shelf mark: R0026. Holding:

** For biographical note see: "5000 Sowjetköpfe", Deutsche Industrieverlags-GmBH, Köln, 1959, p. 619. - Ed.

AGAINST CONSERVATISM IN TECHNOLOGY AND ENGINEERING SCIENCE

V. Semenov*, I. Grinberg+, V. Luk'yanov+,
P. Maiorov+, and G. Morkovin+

**Nauchno-tekhnicheskie obshchestva SSSR, 1960 (4) 32-35

The introduction into industry of rotary automatic lines*** has been discussed in the periodical press for some time, and has been considered twice at scientific-technical conferences organized by the Moscow Regional Board of the NTO (Scientific-Technical Society) for the Engineering Industry. It can boldly be asserted that widespread complex automation in manufacturing industry is associated with rotary machines, just as, let us say, space travel is with jet engines, as television is with radio and electronics, and as the production of man-made fibres is with polymers.

What is the basis of this assertion?

The fact is that rotary machines do not just represent a range of structural shapes, but are the representatives of a class of machines which is replacing the class which, up to now, has been predominant.

*President of the Council of the First Organization of the NTO of the Design Office.

+Engineers, Members of NTO.

**L. L. U. shelf mark: R0122.047. Holding: 1959(1)-

***See also L. L. U. Translations Bulletin, 1960(6) 467-489 - Ed.

These propositions had been worked out theoretically and published in a series of articles 15 years ago by L. N. Koshkin, and in the following years were widely confirmed in practice by the development and use of automatic rotary lines.

We will briefly restate these propositions.

1. The development of metalworking machines is associated with the development of technological processes.

2. The essence of development of technological processes is contained in the change in the interaction between tool and workpiece - from point action at the lowest level of development, to line, and then to surface and spatial action at the highest levels.

3. For processes characterized basically by point action of the tool, machines are developed in which the workpiece is stopped near the tool - these machines represent the lowest, least perfect class of machines. On the basis of line action a more perfect class of machines arises, in which the product is machined while being transported continuously past the tool. Further, on the basis of processes of surface action, there arise machines in which the workpiece is machined while being transported simultaneously with the tools (these were given the name, rotary machines). Finally on the basis of spatial action, it becomes possible to carry out working during mass transportation of the product.

4. The necessary prerequisites for widespread complex automation are associated with technological processes of the highest classes. These pre-requisites can be used completely only by changing to machines of the highest class, namely, rotary machines, since machines with mass transportation of the workpiece cannot, at present, come into widespread use for they are associated with the

class of spatial technological processes.

These considerations (which were put forward in general terms in Nauchno-tekhnicheskie obshchestva SSSR, 1959 (9)) are very important in practice. They determine where and by what technical means the problems of complex automation should be solved in order that the solutions are both feasible technically and advantageous economically.

Disregard of these considerations would force practice to mark time before insuperable obstacles and discredit the very idea of complex automation.

It is necessary to say that the controversy about the new trend in the automation of production processes has been too protracted. It should be emphasized that the opponents are mainly representatives of research circles which, in the first instance, are responsible for the theory and practice of complex automation.

The leaders and a number of workers of technological institutes, headed by Comrade Lazarev, deny the expediency of the application of machines of the rotary type. Leading engineers of this institute, N. P. Kovalev and L. L. Makarov, contend that "much the biggest defect of the rotary principle of machine-tool construction is the low specific output, which derives from the single working position of a rotary machine-tool in place of the equally productive multi-head machine-tool with stationary positions".

It is not difficult to satisfy oneself that such an index as the output of a unit cutting tool (in unit time) cannot, by itself, serve as a criterion of efficiency of these or of any other machines. The main indices of efficiency of machines are, as is well known, the productive output for unit cost of the machine, for unit area, for unit of

energy consumed, and for unit utilization of labour.

The possibility of lowering the output per unit tool in overall high productivity is one of the most important advantages of rotary machines, and not a disadvantage as Comrades Kovalev and Makarov imagine. This reduction in output per unit tool is brought about deliberately and is not in the least forced on one. It is necessary for increasing the stability of the tool and for ensuring optimum conditions for the course of the technological process.

"The second principal disadvantage of rotary machines" - in the opinion of these comrades of ours - "is that the working positions in these machine-tools are in continual movement. This complicates the design and lowers the exploitability of the machine".

In reality this is the first and foremost advantage of machines of the rotary type, ensuring high, economically efficient productivity, independently of the technological time of working. It is just this most important condition for the fulfilment of technological operations during continuous transportation of workpiece and tools which allows the attainment, in the general case, of economically efficient complex automation of production, and the settlement of the problem of equal productivity in machines whose operations are of different duration. In addition this is one of the chief factors in a high utilization coefficient for the equipment, on account of the easing of the technological conditions without reducing the productivity of the machines.

"The third principal disadvantage of rotary machines", declare Comrades Kovalev and Makarov, "is that their application is associated with limitations of size in which each working position of the rotating rotor must be allowed for in the design".

This consideration points, at the very least, to the reluctance

of critics of the rotary principle to see developments in their proper perspective.

It is well known, is it not, that the first Soviet artificial satellite weighed some tens of kilogrammes, while the third sputnik achieved a weight of about one and a half tons. It is also well known that the first rotary lines were established for the manufacture of products weighing several grammes, but already, at the present time, products weighing some tens of kilogrammes are machined on rotary lines.

Professor E. P. Unksov considers that to associate the possibilities of complex automation with a definite class of technological processes is to limit the prospects of complex automation. Such an assertion is based on the fact that Professor Unksov does not identify the direction of development of technology as away from point-action processes to surface and volume processes, and therefore does not recognize the inevitable displacement of point processes by line, surface and volume processes. The realization of complex automation associated with a definite class of technological processes appears to him to be a limiting prospect in the development of the technique.

In striving to reject the existence of a definite direction in the development of technology, Professor Unksov considered it possible to assert that processes have always developed in parallel and that processes of surface action, casting for example, arose at the same time as point processes. Such an argument cannot be considered convincing.

It is doubtful whether even a single case can be cited where the manufacture of some product was changed over from a forming process to turning and milling. However there are innumerable examples, in all branches of industry, of the replacement of some

type of machining process by various processes involving surface action of the tool on the product (casting, forging, etc.).

Inaccurate opinions about the theory of the realization of complex automation lead inevitably to futility in practical activities. Thus, for example, the accomplishment of technological operations based on accurate weight-batching of the material in rotary lines was, at one time, open to grave doubts. The technological institute referred to above opposed the use of such operations in rotary lines. It considered that it was not possible to achieve high productivity with the necessary accuracy of weighing if the weights were in continuous movement.

In due course work on the use of weight-batching of materials was carried out simultaneously by the design office in the charge of L. N. Koshkin and by a technological institute. As a result it was found that a machine-tool in which the weights were immovable did not pass the inspection tests, and in the end it was not introduced into industry.

An automatic rotary line based on accurate weight-batching, created by the design office, on which work began some years later, passed the inspection tests and was successfully put into production. The productivity of this line was twice as high as with an intermittent machine-tool.

At present, automatic rotary lines using accurate weight-batching are manufactured in several versions and are working successfully in a number of enterprises in this country.

Questions of accurate automatic batching are of great importance in the manufacture of various plastics, ceramics, and all kinds of castings. In automatic rotary lines the rotors for accurate batching

are component parts and work in synchronism with the other rotors, in particular, the power, packing and inspection rotors, etc.

Special attention should be given to the attitude of the leaders of ENIMS (The Experimental Research Institute for Metal-cutting Machine-tools) to the introduction of rotary lines.

Firstly, they do not see a common process in the development of technology and of working machines, denying that side by side with evolutionary development there exists a revolutionary path of development - a transition from machines of discontinuous action to qualitatively new machines in which working of the product takes place during their time of transportation.

Secondly, they contend that it is necessary to provide a sufficient variety of automation devices and that these devices, added to existing machine-tools and machines, can convert them from non-automatic or semi-automatic to automatic lines.

Thirdly, they do not consider equal productivity in various technological operations to be obligatory. These opinions are erroneous.

Automatic machines of unequal productivity cannot be combined rationally with automatic systems. The incorporation of such machines in a system is difficult to achieve technically and is also, as a rule, an economically unprofitable business, which is corroborated by a series of practical investigations by ENIMS in the field of automation.

According to data presented by the Director of ENIMS, A. P. Vladzievskii in the collection of papers "Avtomatizatsiya protsessov meshinostroeniya"*, a factory making pistons incurs a

*Automation of Engineering Processes.

loss of 3 313 000 roubles a year.

A second example of high costs is given by the automatic lines for the production of ball bearings. "If the initial expenditure on the design and assimilation of new designs is discounted, the cost price of the bearings is increased by 16 per cent"(Kurakov, I. G. "Tekhnicheskii progress i rost proizvoditel'nosti truda")* .

All this is explained by the fact that the complex automation was carried out on the basis of such technological processes and by means of machines which are inherently unsuitable for the solution of this problem.

During the past year the scientific community has twice had its say in the use of automatic rotary lines. We have in mind two extensive scientific conferences. The Moscow Regional Board of NTO for the Mechanical Engineering Industry referred the recommendations of the conference to the leaders of ENIMS. Quite recently the deputy director of the scientific section of the institute, Comrade Vasil'ev, sent a reply in which he "protested" against the recommendation on the use of rotary lines.

Denying a definite direction for the development of technological processes and working machines, the leaders of ENIMS categorically deny the need for the widespread introduction of rotary lines.

In his reply Comrade Vasil'ev writes, in particular, that "excessive enthusiasm for rotary lines may bring considerable material damage to the national economy and may delay the development of the automation of productive processes in various branches of industry".

He justifies this conclusion by saying: "For the production of

* Technical Progress and the Growth of Productivity of Labour.

castings of small (and medium) weight, carousel* casting machines have been used successfully for a long time, and there is no need whatsoever to incorporate such machines into rotary lines. Such a combination of working carousels* with transport rotors gives rise to an increase in the number of working positions owing to the formation of dead zones between the transport rotors, that is, it leads to a rise in cost and complexity of the machine and to a reduction in their technical-economic index."

Consequently, it seems to Comrade Vasil'ev that casting has reached the limit of automation and that further development is not possible. It is doubtful whether one can agree with this. As for an increase in the number of positions and complexity of the rotors, this suggestion can only show an extremely scanty knowledge of rotary lines.

In addition, Comrade Vasil'ev raises the old, hackneyed point that rotary lines do not ensure continuity of the technological process because of 'dead zones' in the rotors, and increase the number of working positions in rotary lines.

But every separate piece of working on the product is discontinuous because an interval is necessary for the tool to return to its initial position and for loading a new piece of work.

And what is more, in this so-called 'dead zone' the tool is prepared for the subsequent working operation (blast-cleaning, lubrication, inspection of surface finish). If the tool fails it is sometimes necessary to replace it without bringing the line to a stop. Such a tool replacement is also carried out in the 'dead zone'. Thus the presence of a 'dead zone' of any necessary extent is really an advantage of rotary lines. The concentration of working tools in the rotor

*centrifugal casting machine - Ed.

is also an advantage of rotary lines since it allows less severe technological conditions to be used and increases tool stability.

"For the mass production of sheet pressings", writes Comrade Vasil'ev, "the use of rotary lines serves no purpose since such lines, with complicated kinematics, can by no means compete in productivity and economy with high-speed pressing automatics."

The confusion of ideas here between a rotor and a rotary line must be noted The fact is that a series of operations and not just a single stamping operation are carried out in a rotary line. A rotary line for the manufacture of gaskets for i.c engines can serve as a typical example: side by side with the stamping operations are assembly, inspection and finishing operations and other lines for various operations. Incidentally, the difference between a rotor and a rotary line is not realised either by A. P. Vladzievskii. On page 19 of the book "Avtomaticheskie linii v mashinostroenii"* he gives a diagram of a rotor, calling it a rotary line, in which, for some reason, the rotor is called the block holder and tool block.

Furthermore, Comrade Vasil'ev is not familiar with the historical development of rotary lines, and does not know that the first rotary lines actually supplanted high-speed pressing automatics.

Neither is this "objection" convincing: "With the inspection of dimensional accuracy of the finished parts", writes Comrade Vasil'ev, "the inspection of electrical properties, shape, and dynamic and strength characteristics, especially with close tolerances, it is preferable for manufacture to involve the least number of transfers, since each unnecessary transfer, sliding contacts and rotating distributors give additional errors of measurement ....."

*(Automatic Lines in Mechanical Engineering), L. L. U. shelf mark: R15742/43

This denial also indicates ignorance of the principle of operation of rotary lines. At present, a variety of types of inspection are carried out in rotary lines, beginning with inspection of linear, diametral and weight factors and finishing with inspection for completeness of the product.

How then is it possible to explain that the basic theoretical assumptions for the new direction of complex automation still have opponents, even today when practice corrobrates their correctness?

We think that it is explained by the well-known conservatism of some scientists and specialists in the theoretical development of technology and engineering science.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the D. S. I. R. Lending Library Unit, 20, Chester Terrace, London, N. W. 1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar reports they may have made in the Lending Library Unit.

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(Report on visit to VINITI, the All-Union Institute of Scientific and Technical Information in Moscow, in October 1959.)
LLU shelf mark: V 63

POTTINGER, M. C. : "Libraries in the Soviet Union", in "Proceedings of the Annual Conference, Scarborough 1960", pp. 24-31. The Library Association, Malet Place, London W. C. 1, 1960.
(Text of paper and discussion of report on visit to the USSR in January 1960. The programme included 18 libraries, including the Lenin State Library, the Moscow Central Library, the Central Library of the Lenin District of Moscow, the "Pushkin" Library

(the central library of the Bauman District of Moscow), the Likhachev Automobile Factory Library, the Moscow University Library, the Fundamental Library of Social Sciences, the All-Union Library of Foreign Literature, the All-Union Book Chamber, and the All-Union Institute of Scientific Information.)
LLU shelf mark: V 68

EDUCATION

Anon.: "With Hand and Head", Technology, October 1960, p. 266.
(Report on visit to Trade School No. 6 in the Lenin District of Moscow. The school provides training for 15-year old school leavers and courses last two to three years.)
LLU shelf mark: V 62

AUTOMATION

MACMILLAN, R. H.: "The Moscow Congress of IFAC", Process Control and Automation, August 1960, pp. 375-379.
(Report on the Congress held in Moscow 27th June to 7th July 1960, and on visits to a number of plants and institutions. These included the "Vibrator" (electrical instrument) plant in Moscow, the Second State Watch Factory, Power Station No. 20 of the Moscow grid, the "Krasnyi Proletarii" Machine Tool Factory, the Kiev Institute of Automation, the Institute of Automation and Telemechanics in Moscow, and the Leningrad Institute of Electrical Engineering.)
LLU shelf mark: V 51

MARKHAM, D. P.: "---", Unpublished report by author at General Precision Systems Ltd., Bicester Road, Aylesbury, Bucks.
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LLU shelf mark: V 50

RENNIE, D. C.: "Report on Moscow Congress of the International Federation of Automatic Control, 27th June-7th July, 1960", Unpublished report by author at Metal Box Co., 37, Baker Street, London, W.1.
(In addition to a report on the Congress, one chapter is devoted to a report on institutions and plants visited. These included the State Ball-Bearing Factory in Moscow, the Computing Centre of the Academy of Sciences of the USSR in Moscow, the "Sverdlov" Machine Tool Factory in Leningrad, the Institute of Automation in Kiev, and the Computing Centre of the Ukrainian Academy of Sciences in Kiev.)
LLU shelf mark: V 48

ROSENBROCK, H. H.: "Visits made during IFAC Conference", Unpublished report by author at Constructors John Brown Ltd., CJB House, Eastbourne Terrace, London, W.2.
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in Moscow, Power Station No. 20 of the Moscow Power System, the "Sverdlov" Machine Tool Factory in Leningrad, and the Institute of Automation of the Ukrainian Academy of Sciences in Kiev. See also report V 57.)

LLU shelf mark: V 56

ROSENBROCK, H. H.: "I. F. A. C. Conference, Moscow 1960". Unpublished report by author at Constructors John Brown Ltd., CJB House, Eastbourne Terrace, London, W. 2.

(Report on the Conference and plants and institutions visited. See also report V 56.)

LLU shelf mark: V 57

TRUXAL, J. G., et al. "The Meaning of IFAC". Reprint from Control, August and September 1960.

(This composite report includes an "Eagle's - Eye View of the Congress" by J. G. Truxal, "Overboard with the Frequency Response" by J. H. Westcott, "Digital Computer Control" by R. J. S. Paul, "Gulf between Theory and Practice" by R. J. Redding, "These are the Practical Needles in the Theoretical Haystack" by D. B. Foster, and "Control Engineering in the USSR" by J. H. Westcott, H. H. Rosenbrock and J. C. West. This last section includes reports on visits to the Institute of Automation and Telemechanics in Moscow, (J. H. W. and H. H. R.), the Institute of Electromechanics in Leningrad (J. H. W.), the Institute of Automation in Kiev (J. H. W. and H. H. R.), the "Krasnyi Proletarii" Machine-Tool Factory in Moscow

(H. H. R.), the "Sverdlov Machine-Tool Factory (H. H. R.), Power Station No. 20 of the Moscow Power System (H. H. R.), and the Leningrad Institute of Electrical Engineering (J. C. W.).)

LLU shelf mark: V 53

ELECTRICAL ENGINEERING

DUNCAN, J. S., et al.: "Report of Visit to USSR by Delegation from Canadian Electric Utilities, May 14 to June 2, 1960". Ontario Hydro, Toronto, Ontario, Canada, 1960.

(The report comprises a general survey of the visit, a translation of a report by N. Bondarev of the Ministry of Power Stations Construction in the USSR on the main aspects of electric power development in the USSR, and notes on establishments visited. These included the Cherepetsk Steam Power Station, the Volga "V. I. Lenin" Hydro Power Station near Kuibyshev, the Stalingrad Hydro Power Station, the Bratsk Hydro Power Station about 400 miles north of Irkutsk, the Irkutsk Hydro Power Station, the Staro-Beshevsk Thermal Power Station near Stalino, the Novo-Voronezh Nuclear Power Station, the Beloyarsk Nuclear Power Station near Sverdlovsk, the Kharkov Turbine Works, the Leningrad Metal Works, the "Elektrosila" Plant in Leningrad, and the "Vedeneev" Hydro Technical Research Institute in Leningrad.)

LLU shelf mark: V 61

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(Interview concerning visit noted above: V 64)
LLU shelf mark: V 60

STURSBERG, P.: "This is Peter Stursberg, your C. B. C. Roving Reporter for Today from Ottawa". Unpublished transcript of broadcast interview with J. L. Gray, June 1960.
(Interview with J. L. Gray, a member of the Canadian Electric Utilities delegation to the USSR. See also V 64 above.)
LLU shelf mark: V 61

CISLER, W. L., et al. "A Report on Electric Power Developments in Poland". Edison Electric Institute, 750 Third Avenue, New York 17, N. Y., U. S. A.
(Report on visit by 3-man team 8th - 22nd August 1959. Facilities visited included the Zeran Heat and Power Station, the Zeran Transmission and Distribution Station, Lodz 2 Heat and Power Station, Mory Substation, Janow Substation, the Konin Heat and Power Station, the Blachownia Heat and Power Station and the Skawina Heat and Power Station. The report includes a general survey on electric power developments in Poland.)
LLU shelf mark: V 66

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(Brief report on visit in 1959 (?).)
LLU shelf mark: V 67

CHEMICAL ENGINEERING

GOODMAN, M., and MARK, H.: "Soviet Polymer Science I". Unpublished report by authors at Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn 1, N.Y., U.S.A. (Report on visit (in 1959?) to Moscow and Leningrad. Institutions visited included the "Karpov" Institute of Physical Chemistry, the University of Moscow, the Institute of Element Organic Compounds, the Institute of Oil and Coal Research of the Academy of Sciences of the USSR (all these in Moscow) and in Leningrad the Institute of Macromolecular Chemistry, and the "Lebedev" Institute of Synthetic Rubber Research. Details of work in progress and some literature references to it are included.)
LLU shelf mark: V 70

GOODMAN, M., and MARK, H.: "Soviet Polymer Science II". Unpublished report by authors at Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn 1, N.Y., U.S.A. (Information collected during a visit of Research Laboratories in Moscow, Leningrad, Kiev, Tashkent and Samarkand and during a Symposium on Cellulose held at the University of Uzbekistan in Tashkent on 7th - 9th May, 1959. Details of work in progress with literature references.)
LLU shelf mark: V 71

GOODMAN, M., and MARK, H.: "Soviet Polymer Science III". Unpublished report by authors at Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn 1, N.Y., U.S.A. (Following a note on the university-level education system in the USSR and the Academy of Sciences of the USSR, detailed reports are given on the work of the physical, organic and organo-metallic groups in the Macromolecular Institute in Leningrad. For other parts of authors' report see above and V 21 and V 22 listed earlier *.)

LLU shelf mark: V 72

*L. L. U. Translations Bulletin, 1960 (10) 904

L. L. U. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

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THE USE OF SCALE IN STEELMELTING BY THE SCRAP-ORE PROCESS

The use of millscale as a substitute for ore in open-hearth furnaces has reduced limestone consumption, made it possible to melt low-sulphur steels, reduced the total amount of slag formed, accelerated slag formation, and reduced steel production costs. A full report appears in Stal in English 1960 (8).

TRANSLATIONS OF RUSSIAN BOOKS

Butterworths, London, announce the publication of the following book:

LIVSHITS, A. L.: "Electro-Erosion Machining of Metals" 115 pp., 30s.

This is a translation of "Elektroerozionnaya obrabotka metallov", published by Mashgiz, Moscow in 1957.

The information given in this book constitutes a complete and up-to-date description of the state of the technique, technology and industrial uses of electro-erosion machining. Greatest importance has been placed on the electro-pulse methods which have better technical and cost characteristics and a wider field of application than the electro-spark. Among the various uses of electro-pulse machining, descriptions are given mainly of the more thoroughly investigated copy-drilling applications, which have proved the most difficult to get into operation, but the most versatile in technological capabilities.

Electrical machining methods and their offshoot, electro-erosion machining, form a self-contained branch of electrotechnology which is only in the early stages of development. The author provides a description of these methods from the simple physical viewpoint, to establish general laws holding good for the various types of electro-erosion processes. He introduces a number of definitions and classifications which will be of use in the further working out of the basic ideas in this new field of electrotechnology.

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KURNOSOVA, L. V.:	"Artificial earth satellites" Vols. 1. &. 2
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SHUBNIKOV, A. V.:	"Principles of optical crystallography"
YATSIMIRSKII, K. B., & VASIL'EV, V. P.:	"Instability constants of complex compounds"
KIBEL', I. A.:	"Soviet research in geophysics - Volume 1: A collection of articles on dynamic meteorology" (Trudy of the Geophysical Inst. of the Academy of Sciences of the USSR No. 37)
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BESSONOVA, E. N. et al.:	"Soviet research in geophysics - Volume 4 Investigation of the mechanism of earthquakes" (Trudy of the Geophysical Inst. of the Academy of Sciences of the USSR No. 40)
ALTOVSKII, M. E. et al.:	"Source of oil and the formation of oil layers" (Estimated publication date: 1960)
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THE PRESENT STATE OF PETROLEUM CHEMISTRY AND TECHNOLOGY IN CHINA

*Chzhan Da-yui (Chan Ta-yü)

+Khimiya i tekhnologiya topliv i masel, 1960 (4) 66-69

In old China the oil industry was insufficiently developed, very few oil deposits were opened up, and equipment and operating methods were primitive. Only 2 780 000 t of crude oil had been won in the 42 years from the exploitation of the first well in 1907 up to 1948. The range of products resulting from petroleum processing was extremely limited. A large volume of petroleum products was imported. The highest annual output of crude oil (in 1943) was 319 000 tons. On the eve of the country's liberation the annual output of crude oil was only 70 000 tons.

Scientific research on petroleum refining could make no progress under the conditions prevailing in old China. A small group of research workers was investigating the replacement of petroleum by vegetable oils and other substitutes and the semicoking of solid fuel. Their equipment was primitive and few results of practical value emerged.

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*Institute of Petroleum of the Academy of Sciences of the Chinese People's Republic

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After the liberation of China and the creation of the Chinese People's Republic, a marked change occurred in the development of the petroleum industry. The old oilfields, such as Yümen and Yangchuan (?), were steadily extended and new deposits were opened up (e.g. Karamai, Szechuan, Tsaidam).

The existing oil refineries were reconstructed and ten new refineries and synthetic liquid fuel plants were built. In 1958 the output of crude oil was seven times higher than in the best years before the liberation. About 100 different petroleum products came on to the market. Most of the equipment for the new plant (up to 90%) was fabricated in China itself.

Under the guidance and with the support of the Communist Party of China and the People's Government, scientific research on oil and its processing went ahead. Work was started on the analysis of oils from various fields, and new techniques of examination of oils and refinery products were developed and standardized.

Surveys were simultaneously undertaken of the basic reserves of oil and shale.

In recent years petroleum technologists have developed and brought into practice various techniques of precision analysis of oil such as rectification, chromatography, and spectrometry. Numerous studies on liquid, gas and gas/liquid chromatography and on thermochromatography have led to important results not only for the theory of chromatographic separation but also for works practice.

The group compositions of petroleums and shale tars have been established with the aid of the above methods and others.

About 80 individual hydrocarbons have been identified in the gasoline fraction of Karamai crude, and 20 phenolic and pyridinic compounds in the light fraction of shale tar. The results of this work will form a basis for effective exploitation of available reserves of hydrocarbons and other compounds.

New methods of oil and shale tar refining are being intensively studied. Modern techniques are applied in newly developed methods of processing of Fushun shale tar and Karamai petroleum.

Much work has been devoted to the problem of aromatization of water gas synthesis products. A suitable catalyst has been found and a system for separating the products has been developed. On the basis of these investigations a plant was erected in 1955 and it is now operating successfully.

The platforming process for production of high-octane petrol and aromatic raw materials has been the subject of much research. A suitable catalyst is now available and techniques for working up the products have been developed. This process will soon be operated on the large scale. A highly efficient reforming catalyst was prepared in 1958 and will lead to a 4- to 6-fold increase in productivity of the plants. Research is also being directed towards the production of efficient cracking catalysts.

The problem of desalting of petroleum has been successfully attacked by electrical and chemical methods. Refinery plant corrosion will thereby be prevented. Urea dewaxing of petroleum products is engaging the attention of a number of institutes and works. The method has been found suitable in the manufacture of aviation kerosine and high-grade lubricating oil. A coking process using pulverised coal has gone into operation. It gives higher yield of volatile products.

Lubricating oils and consistent greases were imported into old China. The joint and intensive efforts of scientists and workers have quickly led to home production of lubricants. High-pressure lubricants, for use at high temperatures or under other severe conditions, have also been developed. Their industrial production is impending.

Dry distillation of shales is an important process for producing shale tars but the efficiency of dry distillation falls off considerably over a long period of operation. Scientists and technologists of new China have made a close study of the design of a semicoking kiln and the resulting improvements have enabled its productive capacity to be increased by about 15% and the tar yield by 20%. A new type of kiln was developed in 1958. This uses gas heating and improves the efficiency of the process.

Various processes for working up shale tar have been developed with the aim of producing synthetic liquid fuel. Hydrogenation of a heavy shale tar fraction at high pressure in presence of a molybdenum catalyst is already operated on the industrial scale. Two other schemes have also been developed for industrial production from shale tar of high-quality lubricating oil, diesel fuel, and other products.

Chinese petroleum scientists are now faced with the important problem of working up primary bituminous coal tar. Nearly all parts of China contain reserves of tar-yielding coals (with tar yields of 10 to 40%). Production of coal tar is to be expanded. It is proposed to work up the tar by high-pressure hydrogenation to give a conversion of up to 90% of the asphaltenes. This process is already applied in industry. A medium-pressure (70 atm)

hydrogenation process is also being developed and will permit simultaneous production from tar of about 20% of light phenols and a standard aviation kerosine.

After the creation of the Chinese People's Republic, scientists and petroleum technologists cooperated with workers in reconstruction of a works (for fuel synthesis from water gas) destroyed by the Japanese. They restarted the plants for manufacture of the feed gas, catalyst and synthesis product. Now under development is a more efficient process of synthesis of liquid fuel in a fluidized bed of fused iron catalyst. This process gives a yield of up to 191 g/m^3 gas. A pilot plant has been built for the synthesis of liquid fuel and chemical products.

Research laboratories are studying the synthesis of many catalysts and effecting improvements in their manufacture in connection with the development of the oil refining industry and the synthetic liquid fuel industry. This work has increased the activity and selectivity of many catalysts for reforming, hydrogenation, synthesis, etc.

Much work has been carried out at the same time on catalyst supports (kieselguhr, clay, active carbon, alumina, silica gel, etc.). A systematic study of the fundamental laws of catalytic processes and of catalyst manufacture was started. In this connection the formation of cobalt silicate was found to influence the pore structure and chemisorption energy of cobalt catalyst in fuel synthesis from water gas. In the case of platforming catalyst the bifunctionality of metallic and acidic centres was studied. Research on synthetic aluminosilicate (cracking catalyst) related to determination of the heterogeneity of the active surface.

Studies were made of the effects of nitriding and promoters on fused iron catalyst. The mechanism of nitrogen resistance of hydrogenation and cracking catalysts was investigated. A new approach to the problem of choice of catalysts is made possible by these theoretical studies when supplemented by operating experience.

Industrial chemical separation processes, such as distillation and extraction, play an important part in the winning of chemical raw materials from natural petroleum products. Model apparatus is extensively used in the study of these and other processes. Fractionation of aromatic hydrocarbons obtained by aromatization of water gas synthesis products and by platforming and separation of oxygen-containing compounds from hydrocarbons in the processing of shale tar and in the water gas synthesis were facilitated by study of the gas/liquid equilibrium. These investigations made an important contribution to the solution of practical problems. Many investigations are in progress on the simulation of processes using a fluid catalyst bed or heat-transfer medium (medium-pressure fuel synthesis from water gas, etc.).

Problems of heat transfer and mass transfer in a fixed-bed catalytic converter and the principles of design of this converter are very important in chemical technology. In recent work a direct electric analogue has been used in China for determining heat transfer in a fixed bed and for studying the resistance of the bed. Interesting results from the design angle have emerged.

The direct electrical analogue method has been developed on the basis of modern computer technology and finds application in chemical industry for the solution of intricate problems of unsteady heat transfer, of the emergent curve in chromatography

and of fractionation of multicomponent mixtures...

... Scientific research on oil in China is still by no means on the scale needed for socialist construction. Of course we entered this field decades later than the technically advanced countries of the world. The number of petroleum workers is still too small to cope with all the important and complex problems arising in the industry. We hope, however, that the tasks awaiting us will be satisfactorily accomplished in close collaboration with the scientists of the Soviet Union and other democratic countries.

DEVELOPMENT OF THE HEAVY-AND MINING-MACHINERY INDUSTRY IN THE CHINESE PEOPLE'S REPUBLIC

Chzhou Tszy-Tszyan' (Chou Tzu-Chien)

*Vestnik mashinostroeniya, 1960 (4) 80-82

At present the heavy and mining machinery industry of the Chinese People's Republic produces metallurgical, forging, mining, coal-washing, concentrating, and lifting and handling equipment, equipment for the petroleum and chemical industries, and for irrigation purposes. Equipment of this type is heavy and takes a long time to build. As usual, the works manufacturing this equipment have large foundries, forges, and machine shops and are equipped with powerful means of handling and lifting.

Semi-colonial and semi-feudal China had no heavy industry of any kind of its own and manufactured no heavy engineering and mining machinery. During the occupation of the North-Eastern part of China, Japanese imperialists built several engineering works there which worked on armaments. Engineering works which existed at that time on Chinese territory not occupied by the Japanese were manufacturing a few obsolete types of heavy machines and mining equipment. On the eve of the liberation of China even these factories were destroyed by Kuomingtang troops.

In the years after the establishment of the Chinese People's Republic the heavy and mining machinery industry of the country

*LLU shelf mark: R0032. Holding: 1943 (1)-1948 (12), 1950 (1)-(6), 1953 (1)-

was considerably expanded. Increasing the output rates continuously the enterprises of the engineering industry quickly changed from being mere repair workshops and became plants producing modern equipment, and have now entered the stage of independent design. Old enterprises were reconstructed and a number of new plants built; this provided the foundation for the further development of the heavy and mining machinery industry.

During the operation of the first Five-Year Plan all the efforts of the Chinese people were concentrated on the construction of modern plants with up-to-date technical equipment. These industrial enterprises exerted, and are still exerting, a big influence upon the rate of industrialization of the country. The correct assessment of the type of old plants, and their expansion and modernization enabled these enterprises to play a leading and most important part in fulfilling the first Five-Year Plan. In addition, the local authorities in towns and provinces who combined small engineering workshops to form larger units also created medium-size factories of the heavy and mining machinery industry which were continuously modernized and expanded.

In 1958, during the so-called "large jump", the construction of new plants intensified the development of the heavy and mining machinery industry. In addition to the large works which were started during the first five-year period the construction of a large new heavy-engineering plant began in a South-Western province of China. In some provinces and towns the construction of foundries, forges, and heavy engineering plants began, and a considerable number of other engineering works with a yearly

output of 10 000 - 20 000 t each was started. The construction of these plants will be completed in 1960-61 and will ensure a more rational distribution of the plants of the heavy and mining machinery industry over the administrative regions, provinces and towns, which, in turn, will contribute to the further development of the national economy.

The extensive building of new industries not only increased output but also improved the quality of products.

In recent years the output of heavy machines and mining equipment increased scores of times and the list of products was considerably expanded; at present it includes over 1000 types and sizes of equipment. During the same period the number of workers and other personnel increased more than 20 times, and a considerable increase occurred in the material and cultural well-being of the employees.

A radical change took place in the appearance of the plants of the heavy engineering and mining equipment industry.

The first blast furnace was built in China in 1890. From that time until the liberation in 1949, the number of blast and open-hearth furnaces remained very small, and the best part of the equipment of these furnaces was imported from Japan, the USA, Great Britain, France and other capitalist countries. The private enterprises of old China produced only small equipment. The intense development of the Chinese iron-smelting industry only began after the liberation. The year 1954 saw the beginning of the manufacture of many pieces of blast furnace equipment including electric mud guns. In 1957 the first 1000-m^3 blast furnace was completed. In 1958, during the mass

movement for smelting iron and steel, a large number of small blast furnaces (of less than 255 m^3 capacity) and converters with a capacity of up to 12 t were put into commission. During the same year the construction began of blast furnaces of 1513-m^3 capacity (with a yearly output of 850 000 t of pig iron), and of converters with a capacity of up to 40 t.

Even during the first Five-Year Plan the coke industry received Chinese loading waggons, coke pushers, quenching waggons, and other semi-automatic equipment of this type.

Not a single piece of modern rolling equipment was produced as a complete unit in old China. In 1954 the design and construction of the equipment of rolling mills began. During the operation of the first Five-Year Plan a 500 and a 430/300 medium- and small-section mill were made, and in 1958 a 700-mm blooming mill was built. In 1959 the following were put into production: a 750/550 blooming mill with a yearly output of 400 000 t, a 1200 thin sheet mill with a yearly output of 30 000 t, a 2300 medium sheet mill with a yearly output of 150 000 t, a 650 medium section mill with a yearly output of 300 000 t, and a tube mill for up to 76-mm diameter seamless tube with a yearly output of 10 000 t, etc. The construction of a 900-mm sheet mill with conical fluid-friction bearings intended for rolling high-precision sheet also began in 1959. A 1150 blooming mill was designed in 1958 with the help of Soviet experts, and in 1959 its construction began.

Even in the early years of the existence of the CPR some 500-t capacity hydraulic presses were built, as well as oil presses of 1000-t capacity. During the first five-year period 2000-t oil presses were made for the plastics industry. The first hydraulic

press with a capacity of 2500 t was designed and constructed in 1958. In 1959 the capacity of the hydraulic presses designed and built exceeded 300 t. During the past ten years the construction of powerful hydraulic and mechanical presses underwent a great development.

In 1953 a cone crusher with an output of 500-800 t/h and with a 2100-mm diameter cylinder was made. During the first Five-Year Plan the first complete set of equipment for a mine and a complete concentrating plant with a yearly capacity of 1500 t were built in the CPR, and an excavator with a bucket capacity of 3 m^3 was put into production.

In 1958 other types of heavy equipment were also put into production, for example a double-work sizing machine with a 3-m diameter worm and a daily output of 1788 t, and a flotation plant for various ores, of 60 m^3 capacity with a maximum output of 4200 m^3/h.

During the restoration overhead travelling cranes of 10 and 30 t capacity were built, while during the operation of the first Five-Year Plan a gantry crane of 50 t and an overhead travelling crane of 140 t capacity were built. A 275/75-t foundry crane, a 150/75-t forging crane, and a 20-t cable crane with a span of 360 m were put into production in 1958 and 1959, as well as a 15/3-t capacity and 22.5-m span crane with tubular triangular girder and a 20/5-t capacity and 23.5-m span crane of a special design (a combination of a single-web and a triangular tubular lattice girder).

During the operation of the first Five-Year Plan drilling equipment was made for a drilling depth of 1000 and 1200 m. A heavy drilling plant for a depth of 3200 m is at present in the production stage. In the near future a complete set of equipment for an oil

well will be supplied.

In the field of equipment for the chemical industry a compressor with a delivery of 1600 m^3/h at a pressure of 320 atm is now being manufactured. An 18-m^3/h, 1500 atm compressor is in the construction stage. In order to meet the demand caused by the rapid development of the agricultural industry the production of pressure vessels of various designs for a working pressure of 320 atm was undertaken in 1958 in various parts of the country. This is a matter of great importance for the further development of the chemical-fertilizer industry.

Tremendous progress has been achieved in the exchange of advanced experience and in the application of modern techniques. For example, the foundries already employ the high-speed method of melting steel, and use quick-drying mixtures, etc. Measures were carried out to increase the useful volume of steel-melting furnaces. A 30-t open-hearth furnace is now charged with 50 - 60 t, and a 3-t electric furnace with 7 - 8 t and in some cases even with 10 t. Mechanization is being introduced which has increased to a considerable extent the capacity of production units and the productivity of labour. The steel industry is now capable of producing hollow forgings for large hydraulic presses, forgings for turbine runners, the main shaft of a 25 000 kW capacity hydroturbogenerator, for crankshafts of large diesel engines, and for cylinders.

The years 1958-59 also saw the introduction of advanced production processes, such as two-side forging, sectional stamping, etc. Production increases with every year which passes.

The progress in the field of machining is also indisputable:

in recent years high-speed, high-force cutting was introduced into the industry. It should be especially noted that during the period of the "large jump" a large number of original methods of working metals was developed, which helped in reaching targets set for the machining of large units and components.

A considerable success has also been achieved in welding. The technique for welding parts with a cross section of 600 x 400 mm has been acquired. Electro-slag welding is being used on an ever increasing scale. Some works have been using experimentally the combined welding-and-assembly method in the construction of large components.

As with progress in all other fields, the achievements of the heavy and mining machinery industry of the CPR only became possible because of the correct leadership of the Chinese Communist Party and the unselfish help of the People's Democracies. The Soviet Union has been, and still is, helping the CPR in the construction of large plants, starting from the design and supply of equipment with the necessary instructions and literature, and ending with the training of personnel. In addition, Soviet experts were sent to the CPR to assist in selecting sites for factories and organizing their equipment.

However, despite the enormous progress achieved by the CPR in the construction of heavy and mining machinery it represents only the first step on the road to the great objective, for the level of technical development and organization of production in the CPR is still inadequate compared with the leading industrial countries. The capacity of Chinese industry fails to match the requirements of the country. Many necessary machines are not yet being manufactured.

In order to solve the tremendous problems involved in the building of socialism, the engineering industry of the CPR must continue its expansion in the years immediately ahead.

A cover-to-cover translation of Vestnik mashinostroeniya is being published by P. E. R. A., Melton Mowbray, Leicestershire, under the title of Russian Engineering Journal.

- Ed.

VNIRO - THE ALL UNION SCIENTIFIC-RESEARCH INSTITUTE OF SEA FISHERY AND OCEANOGRAPHY

*P. A. Moiseev

+Rybnoe khozyaistvo, 1960 (7) 8-14

The All-Union Scientific Research Institute of Sea Fishery and Oceanography - VNIRO is an institute serving an industry, unifying the scientific methodical activities of all sea fishery research institutes and co-ordinating their work as well as representing the interests of Soviet science in international organizations on fishing (Fig. 1). This position of VNIRO as the principal fishery institute determines the direction and nature of its work. The following should be mentioned as the main tasks for VNIRO:

(1) scientific-theoretical and experimental work on the basic problems of the organization of sea and ocean fishing (long-term forecasts of the state of the raw material resources for fishing, new areas and objectives for the industry), development of the principles of a rational fishery, increasing the efficiency of the industry, a more effective industrial utilization of the raw material and recommendations for the further development of industrial techniques:

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*Deputy Director, VNIRO

+LLU. shelf mark: R0155. Holding: 1946 (1) - 1950 (12) incomplete
1953 (1) -

Fig. 1. All-Union Scientific-Research Institute of Sea Fisheries and Oceanography (VNIRO).

(2) co-ordination of Soviet fishery investigations into the rational utilization of the fish resources of the open seas with the work of foreign research establishments and laboratories by an active participation in various international fishery organizations (Fig. 2):

Fig. 2. Meeting of Soviet and French scientists arranged in April 1960 to work out a plan for scientific co-operation between the USSR and France.

(3) methodical direction of a number of investigations carried out by the sea fishery institutes:

(4) scientific and technical information on the achievements of Soviet and foreign fishery science and technology.

At present the scientific staff of VNIRO comprises eight Professors and Doctors of Science and 72 Candidates of Science. The main attention of VNIRO scientists is directed towards the solution of the most urgent problems of sea fishing, the most important of which is the study of the resources of the world's oceans, in order to provide a stable raw material base for the fishing fleet. The basic scientific problem is the study of distribution, migration, behaviour and the dynamics of commercial fish populations, enabling a theoretical basis to be created for the development of methods of commercial surveying and forecasting of catches, as well as for realizing practical measures in conducting rational fishing and increasing the efficiency of fishing. In this connection, VNIRO, in close collaboration with the sea fishery institutes, has carried out a number of investigations and worked out suitable techniques permitting the resources, the population of the main commercial fishes and its possible variation to be accurately evaluated and accurate long-term forecasts of catches to be made. Such forecasts, which take into consideration the interests of preservation and reproduction of the fish resources, form the basis of current and projected planning of the development of the fishing industry (Fig. 3).

On the instruction of the Gosplan SSSR (State Planning Committee of the Council of Ministers of the USSR), VNIRO scientists have during the past two years worked out a long term development programme for the Soviet fishing industry. Teams of scientists from the Azov, Azov - Black Sea, Baltic, Caspian,

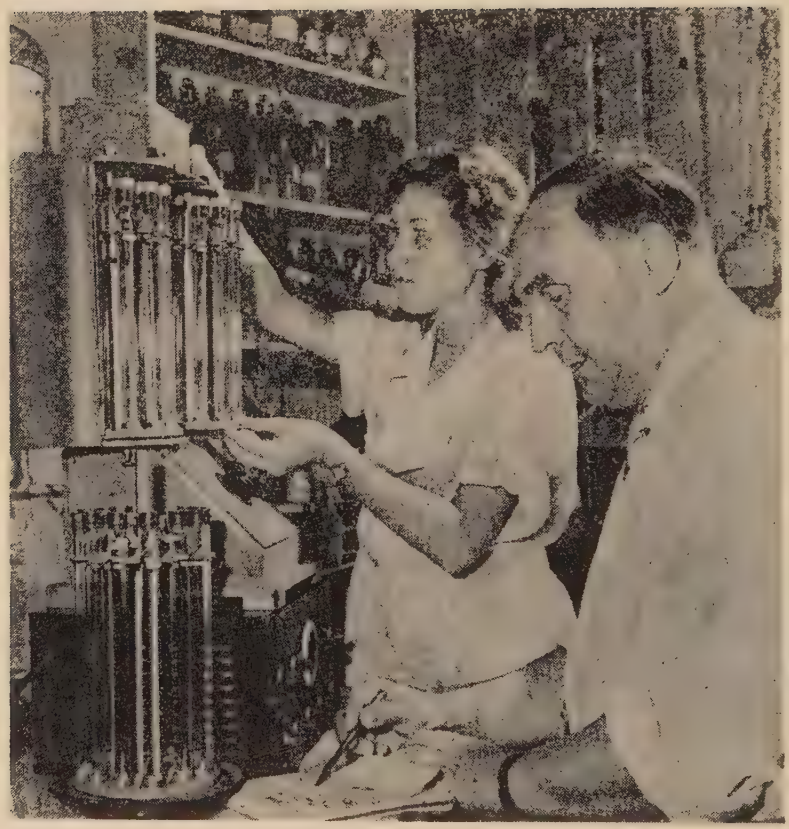

Fig. 3. In the laboratory of industrial oceanography of VNIRO, the Head of Laboratory Candidate of Technical Sciences M. V. Fedosov and Laboratory Assistant V. I. Fomicheva, are carrying out a test of a new multi-vessel electro-photocolorimeter with electronic zero indicator, intended for oceanic research expeditions.

Polar and Pacific institutes took part in this work. The results of this great work were discussed at a meeting of scientists and specialists and in committees of Gosplan SSSR and were well received. With regard to the investigations of the raw material base, one must not forget the great field investigation carried out during the last few years according to the plan of the International Geophysical Year and International Geophysical Co-operation on the determination of the primary productivity of a number of seas, the hydrochemistry of benthic deposits and the temperature balance. The extensive data obtained will enable a fuller investigation of the habitat of commercial fishes to be made and to clarify a number of factors influencing the distribution and population of fishes, and hence fishing.

Together with the sea fishery institutes and sovnarkhozes (Councils of National Economy), VNIRO carried out a number of major scientific expeditions yielding great practical results. Thus, together with BaltNIRO*, PINRO* and the Kherson sovnarkhoz, expeditions were carried out under V. A. Borodatov to study the biology and conditions of the sardine and tunny industry in the region of the equatorial Atlantic. This region has become an important centre for sardine fishing. In the Behring sea region scientists of TINRO and VNIRO found vast accumulations of flat-fish, sea ruff, crab and other products of the sea which are now successfully caught by the Soviet factory ships. Scientific expeditions will assume much larger dimensions when specially designed large research vessels with an unrestricted range will become available.

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*See note at the end of this paper. - Ed.

Since with every year the intensity of world fishing increases, it becomes essential for each country engaged in sea and ocean fishing to conduct a rational industry, ensuring a maximum catch consistent with the maintenance of a given level of stock for the regeneration. Such rational fishing can only be achieved on the basis of scientific fishery investigations. These investigations can be sufficiently complete and effective only in conditions of co-ordination of the corresponding efforts of all countries and by bringing the necessary scientifically-based measures for regulation within the framework of international convention and agreement. Representatives of VNIRO, of the sea fisheries research institutes and of establishments of the Academy of Sciences participate in developing and carrying out the plans of research of the raw material wealth of the open seas and oceans and in founding scientifically the measures taken to regulate the industry.

In order to co-ordinate the plans of the sea fishery institutes, VNIRO holds annual meetings on co-ordination and procedures, during which are examined the drafts of the annual plans, and the procedures in the research work are discussed and co-ordinated. Thus, in 1959 a meeting was held on methods of preserving fish for fodder and preserving the meat of mammals, on the use of antibiotics, and on the organization of economic investigations, etc. Together with the Ichthyology Commission of the Academy of Sciences of the USSR, an open meeting was held on the dynamics of commercial fish population.

The development of ocean fishing requires providing the fishing fleet with large and improved vessels, fitted with the most up-to-date searching equipment and possessing the most modern industrial equipment, as well as introducing new methods of

catching fish. By extending the experimental study of the acoustic characteristics of fish and by working on the development of new radiators, the staff of VNIRO carry out comparative tests with hydro-acoustic instruments to create new forms of small and more effective fish-locating apparatus with a higher resolving power and greater range.

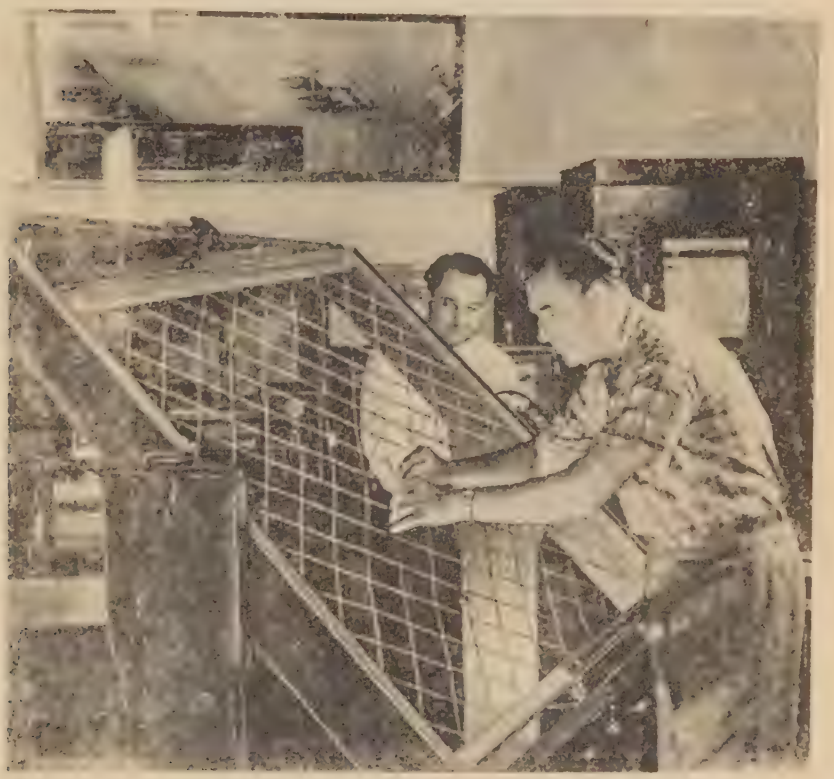

Fig. 4. Staff of the laboratory of commercial fishery of VNIRO check an apparatus for the determination of the tension of net fabric.

In the field of the mechanization of fishing, VNIRO conducts investigations on the selectivity of catching equipment and on the standardization and improvement of trawls and drift nets, searching for and introducing new synthetic materials for the construction of the equipment needed, and on the preservation of nets and other catching equipment (Fig. 4).

The problem of improving the trawling net and method of trawling has always been in the centre of attention of scientific research, design and production organizations of the industry. At present, trawling is one of the most mechanized methods of catching. However, by no means everything has yet been done in this direction: the existing trawl boards could be improved, the unloading of the fish from the trawl without lifting it on board ship is not mechanized, and the trawlers are not fitted with the necessary remote-control equipment for the control of the basic parameters of the working trawl. All these problems occupy a basic place in the plans of investigations on the technique of commercial fishing. At present the staff of VNIRO under the head of laboratory A. I. Treshchev are completing the development and testing of an electronic instrument for the control of the filling of the trawl net with fish, and an instrument controlling the level of travel of the trawl net at different depths.

In connection with the development of fishing in the open seas and oceans the problem of processing fish has, once more, come to the fore. The problem of preserving fish in the conditions of oceanic fishing can be solved by organizing the processing of the fish direct on the boats fitted with the necessary equipment.

The staff of the engineering laboratory of VNIRO, Candidates of Technical Sciences T. I. Makarova, N. A. Voskresenskii, A. V. Kardashev, and others, study the chemical composition and

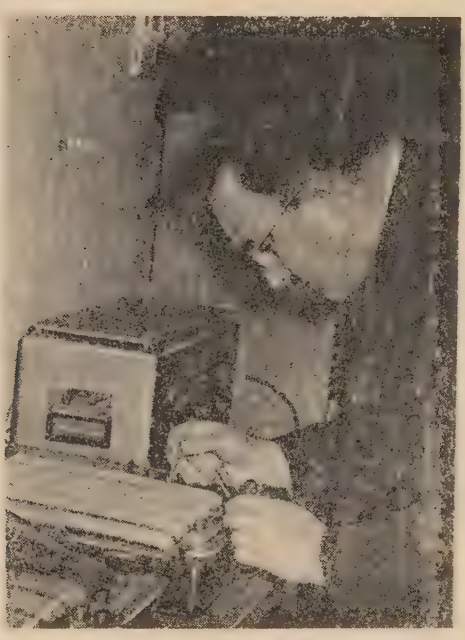

Fig. 5. In the laboratory of fish processing technology of VNIRO Candidate of Technical Sciences is determining by a method of electrophoresis on paper, the change in protein as a result of preserving fish and fish products by gamma-rays from a Co-60 source.

nutritional value of fish and fish products, they develop improved methods of prolonged storage of all forms of processed fish, they

lay down scientifically-based standards for the fish processing for food to fulfil the Seven Year Plan for the improvement of quality and range of fish products (Fig. 5).

According to the Seven Year Plan, fishery research organizations are to solve the problem of complex mechanization and automation of production. At present the fishing industry is inadequately and very unevenly mechanized. While the level of mechanization of unloading of the fish, as well as transport of the fish and of semi-finished products reaches 80% in factories, the mechanization of the separation of the fish does not exceed 20% and many tasks with a high labour content are not mechanized at all.

The research workers, engineers under Candidate of Technical Sciences I. M. Marshak, are developing special devices and instruments for the automation of the control and regulation of the processes of catching and processing fish. The mechanical smoke generator developed at VNIRO with automatic fuel feed and adjustment of the burning process is at present undergoing tests (Fig. 6).

By far the greatest amount of work on the mechanization and automation of the fishing industry is being carried out at the Leningrad branch of VNIRO, NIIMRP (Scientific Research Institute for the Mechanization of the Fishing Industry), which has a design department and an experimental plant. In 1959 alone, 18 items of new equipment were completed for the Leningrad, Murmansk, Kaliningrad, Karelian, Latvian, Lithuanian and Estonian Councils of National Economy and Glavdalrybprom, including: a machine for hauling up the nets (STM-225), a machine

for shaking fish out of the nets, a fish salting unit, a drive mechanism for the roller of the net hauling machine, an attachment for taking out the buoy guides, an instrument for the remote reading of the temperature of the surrounding water. A First Class Diploma for 1959 of the Exhibition of the Achievements of the National Economy of the USSR has been awarded to the

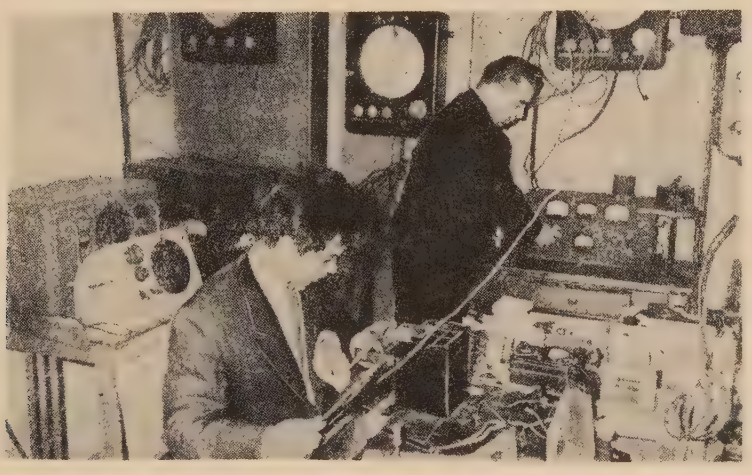

Fig. 6. Testing and adjusting an instrument for the automatic control of the fish curing process.

NIIMRP for developing the designs, constructing and introducing into the industry machines and devices for the complex mechanization of the catching and processing of herrings in medium size trawlers. The scientific staff and engineers of NIIMRP and VNIRO who have played an active part in the development of a scheme of complex mechanization have been awarded medals of the exhibition. A mechanized sprats line is being developed by

NIIMRP and some of its machines have already been produced and are being tested. In inland waters, our specialists study the influence of regulating the river flow upon the nutrition, breeding and population of commercial fish. In connection with this, the optimum water utilization for the fishing industry is being outlined. A number of measures for the improvement of fishing, technical and methodical aspects of the biology of reproduction and biotechnics of breeding of migratory fish have been worked out.

A very important and essential task is the evolution in the VNIRO laboratories of methodical guides and of instructions on the procedure in carrying out scientific research work: the collection and initial treatment of plankton, investigation of the chemical regime of the sea, measurement of salinity of fish products on the VNIRO electronic instrument, testing of smoke generators, development of the theoretical bases of rearing fresh-water forms of salmon on fish farms, etc.

During the past few years, radioactive isotopes have been employed in the laboratory of physiology and utilization of radioactive isotopes (Head: Prof. G. S. Karzinkin). In 1959, the isotope Ca-45 was used for the mass marking of sturgeon fry, which enables important questions on the survival and growth of the fry of this fish to be answered. Last year, radioactive phosphorus (P-32) was used to mark both the rapidly and the slowly growing fry. In that year, interesting data were obtained on the utilization by this fish for the development of organic matter of the carbon of carbonates dissolved in the water.

In the laboratory of the fish processing technology a very interesting and accurate method of spectrophotometric determination in fish fat of non-interchangeable, highly unsaturated fatty

acids (linoleic, linoleic and arachidonic), as well as of clupanodic acid, has been evolved.

Recently the staff of VNIRO has been paying a great deal of attention to underwater scientific investigation. Good results have been obtained from investigations carried out from the submarine "Severyanka". Improved underwater visual observations and investigations with the aid of measuring instruments enable the phenomena and processes of the submarine world, which are of great importance to fishing science and practice, to be studied. VNIRO has been awarded a First Class Diploma for 1959 of the Exhibition of the Achievements of the National Economy of the USSR for the application of the most recent methods of investigation of the sea and ocean depths. The workers taking part in the expedition on the submarine "Severyanka" have been awarded medals of the exhibition.

Scientific and technical information is of great importance for the co-ordination of scientific investigations and as an aid to the sea fishery institutes. The publishers of Rybnoe khozyaistvo have published 133 leaflets in 1959 alone, of which 71 were on new techniques and 31 on the raw material base and breeding of the fish resources. In the same year, Pishchepromizdat published the work of VNIRO and several sea fishery institutes to the extent of 148 printer's sheets*, in which are discussed the methods and results of the most important scientific investigations. The department of scientific and technical information of VNIRO published 16 collections of papers of 64 printer's sheets in 1959, giving information on foreign experience in fishing science, biological investigations in the Atlantic, refrigeration methods and

*Equivalent of 148 single sides of 60 x 92 cm sheet - Ed.

technology, and mechanization.

The workers of the fishing industry face the task during the 7-year period of increasing the catches of fish by 1 750 000 t. Such a task has never been set in the whole history of the fishing industry of the country; fishing science will play a major part in carrying out this task.

Note:

Rybnoe khozyaistvo, 1960 (7) also contains articles describing the activities of other fishery research institutes in the USSR. These include:

NIIMRP	-	Scientific Research Institute for the Mechanization of the Fishing Industry.
PINRO	-	Polar Scientific Research Institute of Sea Fishery and Oceanography "N. M. Knipovich"
TINRO	-	Pacific Scientific Research Institute of Sea Fishery and Oceanography
BaltNIRO	-	Baltic Scientific Research Institute of Sea Fishery and Oceanography
KaspNIRO	-	Caspian Scientific Research Institute of Sea Fishery and Oceanography
AzcherNIRO	-	Azov-Black Sea Scientific Research Institute of Sea Fishery and Oceanography
AzNIIRKh	-	Azov Scientific Research Institute of Fishery

- Ed.

*NEW SOVIET SYNTHETIC FIBRE "VINOL"

S. N. Ushakov

+Vestnik Akademii nauk SSSR, 1960 (3) 52-54

During the seven-year plan of the development of the chemical industry, the production of synthetic materials and synthetic fibres, which occupy a particularly important place, is expected to increase by 12-14 times.

Until recently no development was envisaged for the production of one of the most interesting forms of synthetic fibre, known abroad as vinilon, curalon, manrio, cremon. This fibre is derived from polyvinyl alcohol and has been known for a long time (since 1941), although its commercial production started only a few years ago when there was evolved in Japan the technical method of hydrophobization of this fibre. The production of this, the cheapest of all synthetic fibres, amounted abroad to 4000 t in 1955, and in 1957 - approximately 20 000 t.

The polyvinyl alcohol is obtained by the saponification of polyvinyl acetate synthesized by the radical polymerization of the monomer

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*"Vinilon" corrected to "Vinol" in Vestnik AN SSSR, 1960 (6)

+LLU shelf mark: R0026. Holding: 1942 (1) - 1947 (12) incomplete, 1948 (1)

of vinyl acetate. The monomer, on the other hand, is synthesized from acetylene and the acetic acid which is almost totally regenerated during the derivation of polyvinyl alcohol from polyvinyl acetate. Thus, acetylene is the basic material in the production of the fibre from polyvinyl alcohol. At the present time, simultaneously with the classical method of deriving acetylene from calcium carbide, there is an ever growing increase of its production from natural gas or the by-product gases of petroleum production, by means of the electro- or thermo-oxidizing cracking.

The basic method of hydrophobization of the fibre is its "acetalization" carried out usually by treating it with formaldehyde (which, as is known, is obtained by the oxidation of methanol synthesized in practice from hydrogen and carbon monoxide).

Unlike other synthetic fibres, the fibre made from polyvinyl alcohol is hygroscopic, the knitted fabric and cloth made of such fibre are characterized by "warmth", strength, wear resistance (according to data obtained from the literature it is 20 times superior to wool and 5 times to cotton), stability to the influence of acids, alkali, salt solutions, sea water, fats and many other chemicals. The thermal conductivity of this fibre is considerably lower than that of cotton and approaches the thermal conductivity of wool. It may be subjected to hot ironing (it does not soften at temperatures up to 220°C), it retains its shape and dimensions during washing and dries easily.

The main characteristics of the fibre made from polyvinyl alcohol are as follows:

Breaking strength, dry g/denier	Breaking strength, wet g/denier	Specific weight	Elongation, dry, in %	Elongation, wet, in %	Moisture absorption in %	Hygroscopicity at 65% of the relative humidity
6-8	4-6	1.26	15-30	20-40	30	6.5

The described properties of the fibre made from polyvinyl alcohol open up wide possibilities for its use in the textile industry and for other purposes. From this fibre are made nets for river and sea fishing, ropes, lines, covers for ship hatches and other products. In this field it not only displaces the natural fibre but is also gradually replacing (in Japan) such synthetic fibres as, for instance, nylon.

Great merit for the organization of the production of the home-made fibre from polyvinyl alcohol (which has been named "vinol") is due to the Institut makromolekulyarnykh soedinenii AN SSSR (Institute of Macromolecular Compounds of the Academy of Sciences of the USSR). This Institute has developed methods for obtaining various types of polyvinyl acetate and polyvinyl alcohol, and has put forward a suggestion for a method of analyzing the products and controlling the process. The Institute has obtained and passed to one enterprises the samples of the basic polymers and carries out continuous consulation about the work connected with this problem. In the experimental factory of the NII polimerizatsionnykh plastmass (Scientific Research Institute for Polymerized Plastics) the experimental production of batches of polyvinyl alcohol has been organized. In this factory a chamber unit for obtaining the fibre has been constructed, the technology of its production in all stages has been mastered and the production of the experimental batches

organized. The fibre "vinol" obtained from this plant possesses the degree of acetalization 33-37%. It is characterized by the breaking length up to 40 km and over with the elongation 34-36%. Its shrinkage during boiling over the period of one hour, in individual samples varies from 0 to 1.5%. Particularly important is its small loss of strength during the double bending (loss of strength after 18 000 double bendings varies from 5.5 to 7.7%). The fibre can be coloured by vat dyes, sulphur dyes and by dyes for the acetate silk.

The Institute has clarified the possibility of obtaining a fibre of a higher strength characteristic by increasing the molecular weight of the basic polyvinyl alcohol, by reducing in it the number of the residual acetate groups and by a deeper drawing of the fibre following its heat treatment.

The structure of polyvinyl alcohol opens up very wide possibilities for changing its properties by subjecting it to reactions in its polymer chains. On this basis, besides the usual type of fibre, hydrophobized by the heterogeneous acetalization by means of formaldehyde, there may be obtained a series of synthetic fibres, differing according to the method by which they are reduced to the modification insoluble in water and according to the structure of the end product. Instead of the usual process of using formaldehyde, the fibre may be acetalized by other aliphatic (up to nonylic), aromatic and amino-aldehydes, dialdehydes, acetallyl- sulphides and others. Many such fibres are manufactured abroad on the technical scale (to them belong vinol "B" acetalized by benzaldehyde, vinol "C" acetalized by chloracetaldehyde, vinol "N" acetalized by dimethylnonal, and vinol "S" acetalized by acetallyl-sulphide).

Simultaneously with experimenting with the process for obtaining and organizing the experimental production of the fibre vinol, the Institute of Macromolecular Compounds, in conjunction with the Scientific Research Institute for Polymerized Plastics, is carrying out experiments to obtain new types of fibres based on polyvinyl alcohol. An unusual way of obtaining the fibre is by the synthesis and use of thermoreactive copolymers of vinyl alcohol, particularly with methylol-croton-amide and croton-amide (first obtained by S. N. Ushakov and E. M. Lavrenteva). The corresponding croton monomers, incapable of homopolymerization, are copolymerized with vinyl acetate and other complex vinyl esters. By saponification, the corresponding copolymers of vinyl alcohol are obtained, soluble in water, and in which the links of methylol-croton-amide (or croton-amide) alternate with links or blocks of polyvinyl alcohol. The fibre, made from such copolymers by the usual methods, during thermal treatment changes into the infusible and insoluble state.

This process is realized thanks to the condensation reaction of methylol (or methylol and amide) groups in the neighbouring chains taking place, with the formation of ester or methylene bridges, the number of which can be controlled. To obtain the fibre there may be used either only the copolymers of vinyl alcohol with methylol-croton-amide (with the content of the latter approximately 3 mol. %), or with a mixture of the copolymers of vinyl alcohol with methylol-croton-amide and the copolymers with croton-amide, taken in equivalent quantity (calculated on the amide and the methylol-amide groups). During the interaction between the methylol groups, depending on the condition of the reaction, are formed either ester or methylene bridges, but between the methylol

and amide groups only methylene bridges are formed.

The described method of synthesis enables one to obtain a sufficiently hydrophobic fibre with increased mechanical characteristics and colourability, without acetalization by formaldehyde.

The experience gained in common by the Institute for Macromolecular Compounds, the scientific research institute of the industry and the factory in the development of the fibre "vinol" give reason for hope of obtaining positive results in the investigation of new modifications of the synthetic fibres based on the co-polymers of the vinyl alcohol.

CONVERTIBLE AUTOMATION EQUIPMENT

AN ADVANCED SCIENTIFIC AUTOMATION METHOD

V. Boitsov

*Ekonomicheskaya gazeta, 25th October 1960, pp. 2-3

(The vast programme of technical advance in the national economy based on the complete mechanization and automation of production calls for a rapid re-equipment of the engineering industry with a large amount of high-efficiency automatic machinery, and for a continuous reduction of the time required to put into production new machines, increase their output and reduce cost.

Together with the constructing of new production capacities in the machine-tool and other industries producing automation equipment, it is necessary to introduce new, advanced production methods.

The experience of the USSR engineering industry and of those of some other countries shows that the highest economic effect is attained by the application of the most up-to-date flexible methods of technical planning in the manufacture of new machines and other equipment of convertible type, which makes it possible for individual works to participate directly and creatively in development and construction.

These methods make possible the elimination of many of the shortcomings inherent in the existing methods of producing automation and mechanization equipment.

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* I.L.U. shelf mark: R019792. Holding: 4th July 1960 -

The article of Professor V. Boitsev published below deals with one way in which this problem can be solved.)

Batch Size and Costs

In manufacturing specialized equipment the machine-tool industry at present uses individual-production methods. Nearly all the automatic equipment now produced, including automatic production lines, is being built as unique equipment intended solely for making a specific article. The set-up of these machines cannot be changed to produce a different part. The design is not convertible, which normally excludes any possibility of using it again after the product has been changed.

This practice renders the design and construction of automatic machines a very lengthy operation, and the cost of equipping industry with such machinery is very high. For example, the construction of a medium-size special machine-tool requires 2 to 3 years, while a heavy machine requires up to 3 to 4 years to build. The cost of special-purpose machine tools is several times that of a universal machine.

The reason for the protracted development and the consequent high cost of specialized equipment is that the design and construction of every specialized machine or automatic line has to start, as it were, from scratch. At best, only some sub-assemblies of existing machines can be used in the new equipment. The main shortcoming of this special equipment is its inconvertibility and the impossibility of repeatedly using its elements.

In the sections of the engineering industry using mass production methods, automatic special equipment makes increasingly difficult the improvement of the articles being made and lengthens

their preparation for production.

In industries using batch-production methods the installation of automatic processes requiring specially made inconvertible equipment is not, in most cases, economically justifiable. These types of machine cannot be used after changes in production, and the capital outlay on them cannot be recovered.

Under these circumstances the engineering works using the batch-production principles are compelled to use mainly low-productivity general-purpose machines. The result is that in some of these enterprises the proportion of special and semi-special metal-cutting machines used is only 4 to 5%.

The present practice in the production of the means of automation placed the enterprises in the passive role of receivers of ready made equipment, excluded the possibility of their direct participation in the automation of their own production and led to an inefficient use of equipment.

As a result of the low level of standardization of special automation equipment its manufacture by machine-tool manufacturers is of an occasional, specialized character. Under these circumstances the labour-content in its manufacture is very high, and the output is far below the demand.

The proportion of special and semi-special machines working in the Soviet engineering industry is only 7.3%. In contrast, according to the census of 1958 in the USA, even such a "mobile" branch of engineering as the aircraft industry uses more than 20% of such machines.

In order to achieve the present American level during the Seven-Year Plan, the production of special and semi-special machine-tools should be increased four fold. The urgent task of equipping the

engineering industry with automation and mechanization equipment of convertible type is beyond the capacity of the machine-tool industry. It can only be fulfilled by mobilizing all the available resources of the entire engineering industry, including the machine-tool industry.

The Way to Mass Production

Sectional design, using interchangeable standard elements, makes the equipment convertible, as its component parts can be repeatedly used in new combinations. If necessary, these machines can be completely or partially dismantled and the standard elements of which it consists can be used in new combinations in other machines.

To supply the engineering industry within a short period of time with automation equipment - a fundamentally new approach is needed; new sectional designs must be developed.

This new approach consists, firstly, of providing a combined effort in designing all types of special metal-cutting machines, automatic lines and other types of equipment (welding, riveting, stamping, foundry, etc.) and, secondly, in a large-scale standardization of all the basic parts of this equipment.

Much work has already been done in these directions. In several sections of the USSR engineering industry machines have been designed and are being introduced, for instance special and semi-special machines and automatic lines of fully convertible design assembled from standardized parts such as beds, machine tables, supports, power heads, control units, automation devices, etc.

The experience collected in this field by scientific research and design organizations, and especially by the NII tekhnologii i organizatsii proizvodstva (Scientific Research Institute of Technology and Organization of Production) shows that the degree of standardization of machine tool, automatic production lines and other kinds of automatic equipment can be increased to 80 - 90% of the total number of units and sub-assemblies of which they consist including the automatic- and programme-control devices. In recent years much work has been done in the machine-tool and other sections of the engineering industry on the development of semi-specialized equipment. The work on the production of semi-specialized machine tools and automatic production lines of convertible design is particularly important. Their special features include various components which can be easily dismantled and exchanged, exchangeable fixtures, turret heads, automatic feed units, exchangeable spindles, index heads, etc.

An advantage of standardization combined with the use of sectional design is that the present diversity of sizes and types of the main construction elements can be very considerably reduced.

A concentration of the production of standard elements of the same type in specialized works of the machine-tool and other industries will thus be possible.

This facilitates the transition from the individual production of automation equipment and automatic production lines to the mass production of their standardized elements. This will make possible a several fold increase of the output of automation equipment, without increasing the production capacity, and will reduce the production costs at least two to three times.

Users Design Their Machine-Tools Themselves

A point of particular significance is that the new method opens a fundamentally new approach to the problem of increasing the speed of automation in the engineering industry. The necessary basis is created by making the role of individual works more important in the development of the machines and automatic lines they require.

All medium size and large works will be able to design and assemble the automatic machines and lines from readily available standard elements supplied by specialist manufactures. In the event of changes in the articles being manufactured, or improvements in production processes, the manufacturers themselves will be able to dismantle the equipment which has become redundant and assemble new machines from the same parts.

The assembly of standard units to form new machines makes possible a changeover to a new and more advanced system of equipping industrial enterprises with mechanization and automation equipment.

The special feature of this system is that the entire process of developing and constructing special and semi-special machines and automatic lines is broken up into separate stages which need not be performed in a definite order and can be executed by different organizations.

The first stage is the development of standard assemblies of machines and lines, and standard elements, by the design bureaus of the machine-tool industry.

The second stage is the production of standard elements from which machines and production lines can be assembled, a task which can be performed by the machine-tool manufacturers.

The third stage is the assembly of machines and automatic lines from standard elements made by the works-users in accordance with their own drawings.

This approach enables the time required for providing the industry with automatic equipment to be reduced 8 to 10 times. For example, the design and construction of heavy special machines and automatic lines can be completed in 6 to 10 months, instead of 3 to 4 years, and of light and medium-size types from 2 - 4 months instead of 2 to 3 years.

Reply to Sceptics

The method of assembling special machines from standard elements is being adopted by an increasing number of works, and scientific research and design organizations.

Nevertheless, as with any new method, it meets with some opposition. Some sceptics have labelled the transfer of part of the work on automation (the assembly of machines from ready-made elements) "handicraft", "an anti-specialization idea", etc. They seem to forget the following three facts:

Firstly, it is precisely the extensive use of the principle of sectional construction which makes possible truly specialized production of special-purpose equipment. The concentration of production of similar standard elements at specialized works by the most suitable mass production methods, rather than the manufacture of all components, and sub-assemblies by individual machine-tool makers - is not this true specialization?

Secondly, it is intended to transfer only the final assembly of equipment to the engineering works, not the whole assembly. All sub-assemblies and separate self-contained units will still be

assembled by specialist manufacturers.

And,thirdly, it is essential that the possibility of the rearrangement of the assembly of machines and of the repeated use of its components enables the works quickly to adjust their equipment to the production of new articles, at the same time retaining a high level of automation. The latter fact is of exceptional significance.

Some experts dispute the practicability of the new method of providing special machinery. Is it realistic, they ask, that an ordinary works will be able to cope with such a complicated task as the assembly of automatic machines and automatic lines?

Let us recall, in this connection, that it is proposed to carry out the assembly of special equipment from standard element only at large and medium-size engineering works; for small enterprises this work will be carried out by special design and assembly organizations, which will have to be established in areas with a highly developed engineering industry.

Such doubts are apparently caused by the failure to realize the fact that the assembly of machines and lines from self-contained interchangeable elements is a very much less complicated job than the assembly under present conditions of parts made individually and, also, by the under-estimation of the abilities of the technical personnel now employed in our engineering industry.

A few years, ago, when the new method was still in its early stages, such doubts were understandable, but now results have dismissed them. Many branches of the engineering industry have already accumulated a considerable amount of experience on the application of the new method. In particular, a number of enterprises of the Moscow City Council of National Economy, including

the Brake Works, the Carburettor Works, the "Dinamo" and the Head-Lamp Works, which, in common with other industrial enterprises, have become familiar with the construction of machines and production lines from standard sections, and are at present building 15 automatic production lines and 62 multiple unit machine-tools. On the initiative of the Moscow City Council of National Economy in 1960, a further 28 works began the automation and mechanization of production processes using special equipment assembled from standard units.

A large number of machines of convertible design has been installed in works of the Tatar, the Kuibyshev, Bashkir, and the Voronezh Councils of National Economy and in other regions.

The initiative of the Moscow City Council of National Economy concerning the new method of providing automation equipment has been approved by the July Plenary Session of the Central Committee of the CPSU. The resolution adopted by the Session stresses the need for an extensive adoption of the system. The recent resolution of the Bureau of the Moscow City Committee of the Communist Party contains measures concerned with the development and introduction of the new method to the engineering industry of Moscow, and the organization of centralized manufacture of standard elements of machines and automatic lines.

Machine-Tools - into a Single Standard Range!

The range of standard sub-assemblies now produced by machine tool manufacturers is very small; they are not made at all for small and precision machines. Different works have different designs of standard sub-assemblies for machine tools and automatic lines.

These sub-assemblies are not interchangeable, they have neither agreed positions of the engaging parts nor of dimensions, and this makes them unacceptable.

For example 1.7 - 2.8-kW power heads are made by the Minsk Machine-Tool Works and the Moscow "Ordzhonikidze" Works. The engaging parts of the heads made in Minsk measure 250 by 300 mm while the corresponding parts of the units made in Moscow measure 250 by 250 mm. The shaft diameters are 30 and 20 mm and the width of the slide 250 and 280 mm respectively.

Even the works and organizations of the same economic region (e.g. The "Ordzhonikidze" Works, the "Likhachev" Works, The Moscow Small-Car Factory and others) make standard sub-assemblies with engaging dimensions varying within a wide range.

The reason is that we still do not possess a unified range of this type of equipment which could be used by all manufacturers. The specification "Ryady osnovnykh parametrov silovykh golovok" (Ranges of Basic Dimensions of Power Heads)approved in 1959 by the State Committee on Automation and Machine Construction failed to remedy this. It does not contain data characterizing the type of heads. Other basic parts of machine-tools (tables, indexing heads, supporting elements and others) are not listed in this specification.

It is necessary to set up all-Union standard ranges of elements for various types of equipment (e.g. metal-working, welding, riveting, etc.). Without these it is not possible to organize centralized large-scale production of standardized elements and to use the sectional equipment rationally. The setting-up of such standard ranges in the form of an all-Union standard or a standard

for the engineering industry (NM) is the most urgent task.

Standard ranges with all-Union validity must be developed by combining the existing divisional standards.

The use of divisional standards will help in developing the all-Union Standards which, in turn, will make possible the large-scale production of this highly efficient equipment in the existing machine-tool works. This will solve one of the most acute tasks facing the entire industry.

State Interests Demand . . .

The proposed method should not, of course, be introduced at the expense of other forms of mechanization and automation. We feel that particularly rotary automatic lines, permitting an easy retooling, and various special-purpose machine tools suitable for use in automatic lines, have a great future. However, in these cases provision should be made for combining these machines with others.

Extensive use by industry of special equipment composed of standard elements will lead to a radical change in investment policy; the capital must be channelled to the production of more effective special equipment rather than to the construction of new works. With the new system the same output can be obtained with a floor area reduced by about 30%.

The assembly of special-purpose machine tools and automatic lines from ready made standard elements attracts more and more attention in a number of countries with a highly developed machine-tool industry, e.g. the USA, France, west Germany, etc. Under the pressure of giant companies such as Ford, General Motors and Chrysler the leading American machine-tool manufacturers

agreed in 1959 to standardize a long list of machine-tool sub-assemblies, automatic lines, and other types of equipment.

In a planned socialist economy the wide application of sectional construction methods based on standardized design principles will undoubtedly achieve a much greater economic effect. But we still make very little use of this possibility. The need for carrying out, by the State Planning Commission of the USSR, the State Commission on Automation and Machine Construction, the State Scientific-Technical Committee and the Committee of Standards, Measures, and Measuring Equipment, of a number of measures on a nation-wide scale aiming at the rapid introduction of the new system has become urgent. This will help our industry to fulfil the directives of the 21st Congress and of the July Plenary Session of the Central Committee of the CPSU concerning the complete mechanization and automation of all industries in the shortest possible time and at the lowest possible cost.

REPORTS ON VISITS

The following published and unpublished reports have been received in the D. S. I. R. Lending Library Unit, 20, Chester Terrace, London N. W. 1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar reports they may have made in the Lending Library Unit.

COMMERCE

---- : "SIMA Exhibition in Moscow", Board of Trade Journal, 30th September 1960, pp. 763, 765.
(An account of the arrangements made and of some of the problems encountered, written by the Scientific Instruments Manufacturers' Association members.)
LLU shelf mark: V 59

SCIENCE

MENDELSSOHN, K. : "Science in China", The New Scientist, 10th November 1960, pp. 1261-1263.
(Impressions of a visit to China. Institutions seen included Peking University.)
LLU shelf mark: V 76

MECHANICAL AND ELECTRICAL ENGINEERING

COOPER, F. W. : "A Visit to Poland", The Production Engineer, September 1960, pp. 537-538.

(Brief report on a visit by the Education Officer of the Institution of Production Engineers. Institutions visited included the Academy of Mining and the Metal Cutting Research Establishment (IOS) in Krakow, the "H. Gegielski" Machine Tool Works in Poznan and the Polish Society of Mechanical Engineers and Technicians (SIMP) in Warsaw.)

LLU shelf mark: V 77

---- : "Aspects of Russian Engineering Industry", Machinery (London), 2nd & 16th July, 6th, 13th & 27th August, 10th September, 1st & 15th October, 12th November and 3rd December 1958.

(Following a general survey of the industry and of some new machine tools, reports are given on a number of plants and institutions visited. These included: the "Ordzhonikidze" Machine-Tool Plant (Moscow), "Sverdlov" Machine-Tool Works (Leningrad), MIZ - the Moscow Cutting-Tool Works, TsNIITMash - the Central Research Institute of Technology and Machine Building, ENIMS - the Central Experimental Scientific Research Institute for Metal-working Machines (Moscow), 1GPZ - the First State Ball Bearing Plant (Moscow), ZIL - the "Likhachev" Automobile Works (Moscow), the Metallic (Turbine) Works (Leningrad), and the Elektrosila Electrical Plant (Leningrad). The series of articles is profusely illustrated.)

LLU shelf mark: V 41

---- : "National Electronic Conference of the A. S. Popov Scientific Technical Society of Radio Engineering and Electrical Communication, Moscow May 16-21, 1960". Unpublished report.

(Apart from a very brief note on the Conference, the the proceedings of which are to be published in Russian in the USSR, brief reports on visits to several institutions are given. These include the Computing Centre of the Academy of Sciences of the USSR, the Radio Centre near Moscow, the Institute of Physics and the Institute of Radio Engineering and Electronics of the Academy of Sciences of the USSR, the Moscow Television Centre, and the Department of Physics of Moscow University.)

LLU shelf mark: V 75

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COLLINS, H. E., et al.: "Coal Mining in Czechoslovakia", National Coal Board, Hobart House, Grosvenor Place, London, S. W. 1.

(Report on visit by NCB delegation in August 1959. Institutes and mines visited included the Safety in Mines Research Establishment in Radvanice, the "Czechoslovak Army" mine, the Coal Preparation Research Institute in Ostrava -Kuncicky, the Sucha Stonava Mine, the Mining Machinery Works at Ostroj, the Hlubina Mine in Ostrava, the "Czechoslovak Army" mine coal preparation plant, the "Gottwald III" mine, the "Obranci Miru" mine, the "Stalin" (Chemical)

Works near Most, the Institute for Research on Solid and Gaseous Fuels in Prague.)

LLU shelf mark: V 10

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(Report on visit by NCB delegation in September 1958. In the Upper Silesian Coalfield the visits included the Central Mining Institute at Katowice, the "Polska" mine near Chorzow, the Mining Machinery Exhibition in Gliwice, the "Wesola" mine in Jaworzno, the Debiensko mine, the Mining Machinery Works at Fietrowice, the Mszana and Moszczenica mines near Rybnik, the "Kosciuszko" mine, the Safety Research Institute at the Experimental Mine "Barbara" in Mikolov and the Salt mine at Wieliczka near Krakow. Notes are also included on the International Mining Congress held in Warsaw.)

LLU shelf mark: V 3

INDUSTRIES BASED ON MACROMOLECULAR MATERIALS

PICKETT, A. J. and SMITH, L. P.: "Moscow: June 1960", Rubber and Plastics, 1960 (7) 784-801.

(Following some general observations, special sections are devoted to the ICI Plastics Exhibition in Moscow, the Scientific Research Institute of Polymerizing Plastics in Leningrad and the Plastics Institute in Moscow, plastics in Russia and in particular the Kuskovo Chemical Plant, rubber research and in particular the Institute of Rubber Mechanical Goods

in Moscow, a note on the Russian rubber industry, and in particular on the "Krasnyi Treugol'nik" Plant in Leningrad. A further section contains some useful information on "Travelling to Russia - or How to Visit Moscow and Leningrad in Comfort".)
LLU shelf mark: V 28

---- : "Russian Polymer Research: Macromolecular Symposium 14th-18th June 1960, Moscow University" Rubber and Plastics Age, 1960 (8) 907-915 and 1960 (10) 1185-1186. (Report on papers read at the conference and on work in progress at the "Karpov" Research Institute and the Institute for Elementoorganic Compounds. Visits were paid to these two institutes. Special sections of the report are devoted to stereospecific polymers (W. Cooper), radical, emulsion, graft, block and irradiated polymers (R. J. Ceresa), biological polymers (R. J. Phillips) and emulsion polymers (A. J. Pickett).)
LLU shelf mark: V 28

L. L. U. LOAN COLLECTION OF TRANSLATIONS

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In addition to the accessions from the S. L. A. Centre, L. L. U. has received currently the translations listed below.

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A paper on the influence of alloying elements only slightly soluble in the solid nickel-chromium solution upon properties of heat-resisting nickel alloys is published in Stal' in English, 1960 (9). This paper provides a fairly simple and logical description of the age hardening systems that can be developed from a Ni-Cr base using predominantly Ti and Al but modifying this by other elements such as Nb and Zr and presents a very good summary of the background metallurgy to this type of alloy.

MISCELLANEOUS TRANSLATIONS AND SURVEYS

"The East European Chemical Industry: 1 - Hungary", Joseph Crossfield & Sons Ltd., Warrington, Lancs. October 1958. Unpriced.
Statistics on labour force, protection, foreign trade, import prices and the supply and consumption of certain commodities.

"The East European Chemical Industry: 3 - Eastern Germany", Joseph Crosfield & Sons Ltd., Warrington, Lancs. December 1959. Unpriced.
A statistical survey covering similar ground to the one noted above.

"Some Data on the Soviet Sugar Industry", Joseph Crosfield & Sons, Ltd., Warrington, Lancs. January 1960. Unpriced.
A collection of statistical information based on USSR sources.

Reinhart, R. F.: "An Estimate of Current Operations Research Activity in Russia and Satellite Countries", Operations Research, 1960 (5) 737-746.
Four consecutive issues of the Monthly Index of Russian Accessions of the Library of Congress, Washington, listed 12 papers totalling 65 pages, the five consecutive issues of the East European Monthly Accessions listed 15 papers comprising about 110 pages. The 27 papers had been published in 25 different periodicals.

Shabad, T.: "Geography of the Soviet Synthetic Rubber Industry", Rubber and Plastics Age, 1960 (10) 1161-1164

The survey based on USSR published sources includes information about the production trends.

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IVAKHNENKO, O. G.
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SHILOV, A. E.
RTS 1706. The kinetics and mechanism of the primary decomposition of allyl chloride.
1954 98(4) 601-604 10s.

DERYAGIN, B. V. & DUKHIN, S. S.
RTS 1743. The precipitation of aerosol particles at interfaces. Dust-collection by a diffusion method. Importance to medicine.
1956 111(3) 613-616 10s.

GAZOVAYA PROMYSHLENNOST' (Gas Industry)

NAMIOT, A. Yu.
RTS 1721. Changes in composition of gas in oil and gas accumulations as a result of the solution of gases in water.
1959 4(8) 8-12 12s. 6d

INZHENERNO-FIZICHESKII ZHURNAL (Journal of Physical Engineering)

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ZLOBIN, B. I.
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KRUZHALOV, B. D. et al
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1959 (4) 10-12 7s. 6d

KISLOROD (Oxygen)

FILIPPOVA, G. P. & ISHKIN, I. P.
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KOZHEVENNO-OBUVNAYA PROMYSHLENNOST' (Leather-Footwear Industry)

PLETUKHINA, N. K. & GOLOVTEEVA, A. A.
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1960 (3) 16-20 12s. 6d

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DEMCHENKO, P. A.
RTS 1645. Determining the efficiency of washing substances by colloidal-chemical methods.
1959 25(7) 36-39 10s.

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SOBOL', S. I.
RTS 1733. The conditions for the reduction of lead from its compounds in aqueous media by means of pressurised hydrogen.
1957 (13) 115-122 20s.

TEPLOENERGETIKA (Heat and Power Engineering

TULIN, S. N.
RTS 1728. Heat transfer and resistance in bundles of wire-finned tubes.
1958 5(3) 67-72 15s.

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RTS 1737. Study of cavitation in the impeller of a centrifugal pump.
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RTS 1663. On protecting the atmospheric air against pollution by the flue gases of large power stations.
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RTS 1651. The formation of salt deposits in turbines.
1960 (4) 62-67 12s. 6d

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RTS 1665. The effect of additional axial forces upon the long-time strength of boiler tubes.
1960 (5) 12-16 10s.

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TSITSINA, S. I.
RTS 1674. Perennial leaved onions.
1956 3 102-104 7s. 6d

TRUDY INSTITUTA FIZIOLOGII IMENI I.P. PAVLOVA (Transactions of the Institute of Physiology of I. P. Pavlov)

BORSUK, V. N. & ZAKS, M. G.
RTS 1252. Characteristics of the production of butterfat in cows giving milk of different butterfat content.
1955 4 93-102 25s.

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1955 4 103-108 15s.

KOKORINA, E. P.
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1955 4 132-135 7s. 6d

TRUDY INSTITUTA KHIMICHESKIKH NAUK. AN KAZAKHSKOI SSR (Transactions of the Institute of Chemical Sciences. Academy of Sciences of the Kazakh SSR)

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1959 (4) 11-35 60s.

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27 pages. 67s. 6d

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THE ELECTRIC POWER INDUSTRY OF CHINA

Yu. M. Avsenev

*Byulleten' tekhniko-ekonomicheskoi informatsii, 1960 (9) 81 82

During the year 1959 the electric power industry of the Chinese People's Republic made substantial progress after surmounting considerable difficulties encountered in the power supply of some districts. The rate of the rise in power production substantially exceeded that of the rise in the gross output of industry as a whole, and this made it possible to alleviate the strained position with regard to the supply of electric power to the national economy.

The Rise in Electric Power Production in the Chinese People's Republic.

Year	Electric Power generated	
	kWh x 10^9	% of 1949
1949	4.3	100
1952	7.3	168
1957	19.3	449
1958	27.5	639
1959	41.5	963

In 1959, 51% more electric power was generated than in 1958 and it amounted to a total of $41 \cdot 5 \times 10^9$ kWh (1).

*LLU shelf mark: R00241. Holding: 1958 (1) -

The original plan for the production of electric power was exceeded by 6%; the tasks set by the Second Five Year Plan for 1962 were fulfilled three years ahead of time.

The result of the massive increase in power production is that the Chinese People's Republic has reached ninth place in the world in this field and second place in Asia.

Good progress was also made in the erection of power stations. During the first nine months alone of 1959, 34 large power stations were put into operation. The total generating capacity of the thermal and hydroelectric power stations which started operating during 1959 amounts to 3200 MW (2800 MW for the thermal and 400 MW for the hydroelectric power stations). The plan for increasing generating capacity was overfulfilled by 25%, the rise in capacity exceeding the generating capacity installed during 1958 (1800 MW) by 78% and that installed during the whole of the First Five Year Plan (2500 MW) by 30%. In addition, numerous small rural hydroelectric power stations were erected with a total generating capacity of about 50 MW, which resulted in a rise in the level of mechanization of agricultural work. At the end of 1959 the total capacity of the generator equipment of the power stations in the Chinese People's Republic amounted to 9400 MW, which is five times that of 1949.

The total capacity of transformer equipment for 110 kV and higher voltages installed during the year was 2.2 million kVA (without taking into account the step-up substations at the power stations); the original plan was thus overfulfilled by 28% and the capacity added during 1958 exceeded by 62%.

A total of 4443 km of electric power transmission lines rated for 110 kV and higher voltages was constructed during 1959. This is 10% more than had been planned and 51% more than in 1958 (2).

The cost of erecting power stations has been reduced. In the First Five Year Plan the cost per installed kilowatt for hydroelectric and for thermal power stations averaged 1300 and 1000 yüan respectively - during 1958-59 these figures were reduced to 800 and 700 yüan.

During the First Five Year Plan the erection of a large hydroelectric and a large thermal power station required 5 and 2 years respectively; this has now been brought down to 2 to 4 and 1 to 1.5 years.

During 1959 construction work continued on very large hydroelectric power stations such as those at Sanmenhsia and Liuchiahsia on the Huangho river; at Hsinankiang where the first 72.5 MW generating set has been installed; at Fuchunkiang in the province of Chekiang; and on the 400 MW power station at Chehsi (?) in the province of Hunan and the 900 MW station at Tanchiak'ou (?) on the Hankiang river. By the end of 1959 work had started on the erection of a 1000 MW hydroelectric station on the Chienhsi (?) river (province of Fukien).

During 1959 several hydroelectric power stations were put into service, among them the 25 MW station at Liulangtung (province of Yünnan) which is the first in China to utilize subterranean waters. In 1959, the generating capacity of hydroelectric installations amounted to 18% of the total capacity of the generating installations (as against 8.8% in 1949). Erection work continued on 25 large thermal power stations, each of a capacity of over 100 MW. In particular, the second section of the Peking District Heating and Power Station was erected and the country's first 100 MW generating set operating at high steam conditions * was put into service there.

* presumably high temperature - Ed.

This set was supplied to the Chinese People's Republic by the Soviet Union. In Shanghai, a 300 MW district heating and power station has been built. Two 25 MW generating sets were put into service at the Wangt'ing (?) power station.

A considerable improvement took place in the electric power supply of North-East China which is the largest industrial area. During 1959, three sets of generating equipment of a total capacity of 150 MW were put into service in the Fuhsin and Chilin* thermal power stations. Fushun is being supplied electric power by the Liaoning thermal power station which, with its generating capacity of 650 MW, is the largest in China. The first 50 MW turbo-generator has been put into service there. In Harbin, two steam turbo-generators of 25 MW each have started work.

By the end of 1959, 28 electric power grids for 110 kV had been created and 80% of all power generating equipment installed in the country is connected to them.

During 1959 a large amount of work was carried out on the modernization of power production equipment. Less than 20% of the total generator capacity of the country now operates on old equipment. The specific weight of the rated output of generator sets operating at high pressure and high steam conditions+ has risen from 1% of the total power output of the thermal power station equipment in 1949 to 28% in 1959. Large steam turbo-generators of 25 - 100 MW claimed 42% of the total generating capacity of the thermal power stations in 1959 as against 6% in 1949.

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*Kinin - Ed.

+presumably high temperature - Ed.

The position with regard to protective installations and automatic devices for the electric power networks has undergone a marked improvement. In the case of several large power grids a start has been made with the introduction of remote and supervisory remote control.

The cost/efficiency figures of power station operation have improved. During 1959, the average operating time of the generator equipment of the power stations of the Chinese People's Republic amounted to over 6000 hours (longer by a factor of 2.5 than in 1949). The average consumption of conventional fuel per generated kWh of electric power amounted to 0.55 kg (nearly one half of that for 1949) and at some power stations to 0.35 kg. Acidents and breakdowns of power station and power grid equipment are steadily decreasing; during 1959 the average number of accidents at power stations was 84% less than at the beginning of the First Five Year Plan (1953) and the average number of accidents along power transmission lines has dropped by 81%.

In 1960, electric power production in China will reach 55·5 to $58{\cdot}0 \times 10^9$ kWh which is 34 - 40% more than in 1959 [3]. Rural districts will receive 233% more electric power in 1960 than in 1959. This does not take into account the electric power produced by rural power stations.

During 1960, 192 very large installations are to be erected including 115 thermal and 49 hydroelectric power stations as well as 28 installations for the transmission and transforming of electric power. The generating capacity of the equipment to be installed during 1960 amounts to 4200 MW. The capacity of new generating sets for rural power stations will amount to 200 - 300 MW, exceeding the 1959 level by a factor of 4 - 6.

High-voltage power transmission lines for above 110 kV will be erected over a total distance of 7700 km, i.e. 73% more than in 1959. The capacity of new transformers will total 4.4 million kVA and thereby exceed the 1959 level by 110% [4].

At the end of the first quarter of 1960 the electric power industry of the Chinese People's Republic had produced $14{\cdot}3 \times 10^9$ kWh of electric power, i.e. 63% more than during the same period of 1959.

The volume of capital construction in the electric power industry has been very considerable. The capacity of generator equipment installed in power stations which has been put into service during the first quarter of 1960 totals 770 MW. High-voltage transmission lines for 110 kV and more and covering a total distance of 840 km have been added to the power network. The total capacity of transformer equipment for 110 kV and higher, installed during the first quarter of 1960, amounts to 810 MVA [5].

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ACADEMIES AND RESEARCH INSTITUTES IN AND NEAR MOSCOW

Below we publish the first of a series of lists of institutions in the USSR.

The present list, containing nearly 300 entries, is based on information collected in September 1958 and published in "Moskva: kratkaya adresno-spravochnaya kniga", Moscow 1958, pp. 75-87. Each entry gives (1) the transliterated name of the institution, (2) transliterated official abbreviation, (3) translated name of institution, (4) address, and (5) telephone number. The entries are arranged in the cyrillic alphabetical order of the "key" word in the name of the institution and this word is underlined to facilitate the use of the list.

-Ed.

ACADEMIES

AKADEMIYA NAUK SSSR (AN SSSR). PREZIDIUM

(Academy of Sciences of the USSR Praesidium)
Moskva, Leninskii prosp. 14; tel. komm. V2-00-00.

AKADEMIYA KOMMUNAL'NOGO KHOZYAISTVA im. K. D. PAMFILOVA (AKKh)

("K. D. Pamfilov" Academy of Municipal Services)
Moskva, Kuznetskii most 9; tel. B8-46-82.

AKADEMIYA MEDITSINSKIKH NAUK SSSR (AMN SSSR)

(Academy of Medical Sciences of the USSR)
Moskva, Solyanka 14; tel. K7-05-05.

AKADEMIYA PEDAGOGICHESKIKH NAUK RSFSR (APN)

(Academy of Pedagogic Sciences of the RSFSR)
Moskva B, Polyanka 58; tel. V1-06-42.

VSESOYUZNAYA ORDENA LENINA AKADEMIYA SEL' SKOKHOZYAISTVENNYKH NAUK im. V. I. LENINA (VASKhNIL)

("V. I. Lenin" All-Union Academy of Agricultural Sciences, Order of Lenin)
Moskva B, Khariton'evskii p. 21; tel. B3-26-51, komm. B9-99-09.

AKADEMIYA STROITEL'STVA I ARKHITEKTURY SSSR

(Academy of Building and Architecture of the USSR)
Moskva, Pushkinskaya ul. 24; tel. B9-28-91, komm, B9-99-15.

AKADEMIYA KHUDOZHESTV SSSR

(Academy of Arts of the USSR)
Moskva, Kropotkinskaya ul. 21; tel. G6-39-41.

SCIENTIFIC RESEARCH INSTITUTES

VSESOYUZNYI NAUCHNO-ISSLEDOVATEL'SKII INSTITUT AVTOGENNOI OBRABOTKI METALLOV (VNIIAvtogen)

(All-Union Scientific Research Institute for the Autogenous Treatment of Metals)
Moskva, Shelaputinskii p. 1; tel. K7-04-19.

INSTITUT AVTOMATIKI I TELEMEKHANIKI (IAT AN SSSR)

(Institute of Automation and Remote Control, AS USSR)
Moskva, Kalanchevskaya ul. 15a; tel. K4-52-90.

NAUCHNO-ISSLED. INSTITUT AVTOMOBIL'NOGO TRANSPORTA (NIIAT)

(Scientific Research Institute for Motor Transport)
Moskva B, Dekabr'skaya ul. 23; tel. D2-36-01.

NAUCHNO-ISSLED. EKSPERIMENTAL'NYI INSTITUT AVTOMOBIL'NOGO ELEKTROOBORUDIVANIYA I PRIBOROV (NIIAvtopribor)

(Scientific Research and Experimental Institute for Electrical Equipment and Instruments for Automobiles)
Moskva, Elektrozavodskaya ul. 21; tel. E3-19-43.

GOSUDARSTVENNYI SOYUZNYI ORDENA TRUDOVOGO KRASNOGO ZNAMENI NAUCHNO-ISSLED. AVTOMOBIL'NYI I AVTOMOTORNYI INSTITUT (NAMI)

(State Union Scientific Institute for Automobiles and Automobile Engines, Order of the Red Banner of Labour)
Moskva, Avtomotornaya ul. 2; tel. komm. I6-00-12.

NAUCHNO-ISSLED. INSTITUT AKUSHERSTVA I GINEKOLOGII

(Scientific Research Institute of Obstetrics and Gynaecology)
Moskva B, Pirogovskaya ul. 2/6; tel. G6-60-01.

MOSKOVSKII OBLAST'NOI NAUCHNO-ISSLED. INSTITUT AKUSHERSTVA I GINEKOLOGII (MONIAG)

(Moscow Province Scientific Research Inst. of Obstetrics and Gynaecology)
Moskva, Lepekhinskii tup. 3; tel. K7-65-59.

NAUCHNO-ISSLED. INSTITUT ANTROPOLOGII (NIIAntropologii)

(Scientific Research Institute for Anthropology)
Moskva, Mokhovaya ul. 11; tel. B9-89-82.

TSENTRAL'NYI NAUCHNO-ISSLED. APTECHNYI INSTITUT (TsANII)

(Central Pharmaceutical Scientific Research Institute)
Moskva, Pogodinskaya ul. 10; tel. G6-49-87.

ARKTICHESKII I ANTARKTICHESKII NAUCHNO-ISSLED. INSTITUT (AANII) - Otdelenie ekonomiki

(Arctic and Antarctic Scientific Research Institute - Department of Economics)
Moskva, ul. Razina 9; tel. B8-38-27.

VSESOYUZNYI NAUCHNO-ISSLED. INSTITUT ASBESTA, SLYUDY, ASBOTSEMENTNYKH IZDELII I PROEKTIROVANIYA PREDPRIYATII SLYUDYANOI PROMYSHLENNOSTI (VNIIAsbesttsement)

(All-Union Scientific Research Inst. for Asbestos, Mica, Asbestos-Cement Products and for Planning Mica Works)
Moskva, Pervomaiskaya ul. 104; tel. E5-30-42.

VSESOYUZNYI INSTITUT ASSORTIMENTA IZDELII LEGKOI PROMYSHLENNOSTI I KUL'TURY ODEZHDY (VIAKO)

(All-Union Institute for Various Products of Light Industry and Fashion)
Moskva, Kotel'nicheskaya nab. 25/8; tel. Zh2-61-03.

GOS. ASTRONOMICHESKII INSTITUT im. P. K. SHTERNBERGA (GAISh)

("P. K. Shternberg" State Astronomical Institute)
Moskva, Leninskie gory; tel. V9-30-28.

INSTITUT BIOLOGICHESKOI I MEDITSINSKOI KHIMII

(Inst. of Biological and Medical Chemistry)
Moskva, Pogodinskaya ul. 10; tel. G6-69-80.

INSTITUT BIOKHIMII im. A. N. BAKHA

("A. N. Bakh" Inst. of Biochemistry)
Moskva, Leninskii prospekt 33; tel. V2-32-05.

VSES. NAUCHNO-ISSLED. INSTITUT BUROVOI TEKHNIKI (VNIIBT)

(All-Union Scientific Research Inst. for Drilling Technology)
Moskva, 4-i Verkhn. Mikhailovskii pr. 8a; tel. V2-34-65.

MOSKOVSKII NAUCHNO-ISSLED. INSTITUT VAKTSIN I SYVOROTOK im. I. I. MECHNIKOVA

("I. I. Mechnikov" Moscow Scientific Research Inst. for Vaccines and Sera)
Moskva, p. Mechnikova 5a; tel. komm. K7-07-82.

NAUCHNO-ISSLED. INSTITUT VESOV I PRIBOROV (NIIVesprom)

(Scientific Research Institute of Weights and Instruments)
Mqskva, Kholodil'nyi p. 1; tel. V2-26-80.

VSES. INSTITUT EKSPERIMENT. VETERINARII (VIEV)

(All-Union Inst. of Experimental Veterinary Science)
st. Veshnyaki, M.-Ryazanskoi zh. d., pos. Starye Kuz'minki; tel. komm. Zh2-05-76.

VSES. NAUCHNO-ISSLED. INSTITUT VETERINARNOI SANITARII I EKTOPARAZITOLOGII (VNIIVSE)

(All-Union Scientific Research Inst. for Veterinary Hygiene and Ectoparasitology)
Moskva, Zvenigorodskoe shosse 5; tel. D2-27-81.

INSTITUT VIRUSOLOGII im. D.I. IVANOVSKOGO

("D.I. Ivanovskii" Institute of Virusology)
Moskva, Baltiiskii pos. 13; tel. D7-44-63.

VSES. NAUCHNO-ISSLED. VITAMINNYI INSTITUT (VNIVI)

(All-Union Scientific Research Institute for Vitamins)
Moskva, Novokuznetskaya ul. 7; tel. V1-70-10.

GOS. NAUCHNO-ISSLED. INSTITUT VITAMINOLOGII

(State Scientific Research Institute for Vitaminology)
Moskva, Pogodinskaya ul. 10; tel. G6-52-04.

VSES. NAUCHNO-ISSLED. INSTITUT VODOSNABZHENIYA, KANALIZATSII, GIDROTEKHNICHESKIKH SOORUZHENII I INZHENERNOI GIDROGEOLOGII (VODGEO)

(All-Union Scientific Research Institute for Water Supply, Sewarage, Hydro-technical Structures and Hydro-Geological Engineering)
Moskva, B, Kochki 17a; tel. G5-53-80.

INSTITUT VOSTOKOVEDENIYA

(Institute of Oriental Studies)
Moskva, Armyanskii p. 2; tel. B3-50-59.

.UT VRACHEBNOI KOSMETIKI.

(Institute of Medical Cosmetics)
Moskva, ul. Gor'kogo 19a; tel. B1-43-65.

TSENTR. NAUCHNO-ISSLED. INSTITUT VSPOMOGATEL'NYKH IZDELII I ZAPASNYKH DETALEI K TEKSTIL'NOMU OBORUDOVANIYU (TsNIIMashdetal')

(Central Scientific Research Institute for Auxiliary Components and Spare Parts for Textile Machinery)
Moskva, Marksistskaya ul. 33; tel. Zh1-04-05.

INSTITUT VYSSHEI NERVNOI DEYATEL'NOSTI

(Institute of Higher Nervous Activity)
Moskva, Pyatnitskaya ul. 48- tel. V1-29-23.

VSESOYUZNYI INSTITUT GEL'MINTOLOGII im. Akad. K.I. SKRYABINA (VIGIS)

("Academician K.I. Skryabin" All-Union Institute of Helminthology)
Moskva, Staropanskii p. 3; tel. B8-42-19.

TSENTR. ORDENA LENINA NAUCHNO-ISSLED. INSTITUT GEMATOLOGII I PERELIVANIYA KROVI (TsOLIPK)

(Central Scientific Research Institute of Haematology and Blood Transfusion, Order of Lenin)
Moskva, Nov. Zykovskii pr. 4; tel. komm. D0-00-10.

INSTITUT GENERAL'NOGO PLANA G. MOSKVY (In-t Genplana g. Moskvy)

(Institute for the General Plan of the City of Moscow)
Moskva, 2-ya Brestskaya ul. 2/14; tel. D0-48-83.

INSTITUT GENETIKI (IGEN)

(Institute of Genetics)
Moskva, Leninskii prosp. 33; tel. V2-13-84.

INSTITUT GEOGRAFII (IG AN SSSR)

(Institute of Geography (of the AS USSR))
Moskva, Staromonetnyi p. 29; tel. V1-78-86.

INSTITUT GEOLOGII RUDNYKH MESTOROZHDENII, PETROGRAFII, MINERALOGII I GEOKHIMII (IGEM)

(Institute of the Geology of Deposits, Petrography, Minerology and Geochemistry)
Moskva, Staromonetnyi p. 55; tel. V1-72-70.

GEOLOGICHESKII INSTITUT (GIN)

(Geological Institute)
Moskva, Pyzhevskii p. 7; tel. V1-54-83.

VSESOYUZNYI NAUCHNO-ISSLED. GEOLOGORAZVEDOCHNYI NEFTYANOI INSTITUT (VNIGNI)

(All-Union Scientific Research Institute for Geological Oil Surveying)
Moskva, Shosse Entuziastov 124; tel. Zh4-28-62.

INSTITUT GEOKHIMII I ANALITICHESKOI KHIMII im. V.I. VERNADSKOGO (GEOKhI)

("V.I. Vernadskii" Institute of Geochemistry and Analytical Chemistry)
Moskva, Vorob'evskoe shosse 47a; tel. komm. V2-05-08.

INSTITUT OBSHCHEI I KOMMUNAL'NOI GIGIENY im. A.N. SYSINA

("A.N. Sysin" Institute of General and Municipal Hygiene)
Moskva, Pogodinskaya ul. 10; tel. G6-52-73.

INSTITUT GIGIENY TRUDA I PROFESSIONAL'NYKH ZABOLEVANII

(Institute of Labour Hygiene and Occupational Diseases)
Moskva, Meiorovskii pr. 31; tel. Zh4-02-86; clinic: ul. Obukha 14; tel. K7-55-66.

VSES. NAUCHNO-ISSLED. INSTITUT GIDROLIZNOI I SUL'FITNO-SPIRTOVOI PROM-STI, MOSKOVSKOE OTDELENIE (MO VNIIGS)

(All-Union Scientific Research Institute of the Hydrolysis and Sulphite Alcohol Industry, Moscow branch)
Moskva, Turchaninov p. 4; tel. G6-77-64.

NAUCHNO-ISSLED. INSTITUT GIDROMETEOROLOGICHESKOGO PRIBOROSTROENIYA (NIIGMP)

(Scientific Research Institute of Hydrometerological Instrument Manufacture)
Moskva, p. Pavlika Morozova 12; tel. D2-18-06.

VSES. NAUCHNO-ISSLED. INSTITUT GIDROTEKHNIKI I MELIORATSII im. A. M. KOSTYAKOVA (VNIIGIM)

("A. M. Kostyakov" All-Union Scientific Research Institute of Hydraulic Engineering and Land Reclamation)
Moskva, ul. Pryanishnikova 19; tel. I6-01-74.

NAUCHNO-ISSLED. INSTITUT "GLAVMOSSTROYA" (NII Mosstroi)

(Scientific Research Institute of "Glavmosstroi"*)
Moskva, pos. Ramenki, prombaza; tel: V9-10-06.

GOS. NAUCHNO-ISSLED. INSTITUT GLAZNYKH BOLEZNEI im. GEL'MGOL'TZA

("Helmholtz" State Scientific Research Institute for Eye Diseases)
Moskva, Sadovaya-Chernogryazskaya ul. 14/19; tel. B7-16-42.

VSES. NAUCHNO-ISSLED. INSTITUT "GOZNAKA" (VNIIG)

(All-Union Scientific Research Institute of "Goznak"**)
Moskva, Mytnaya ul. 19; tel. V2-19-83.

INSTITUT GORNOGO DELA (IGD AN)

(Institute of Mining (of the AS))
Moskva, 1 -i Akademicheskii pr. 18; tel. V5-21-02.

TSENTR. NAUCHNO-ISSLED. GORNORAZVEDOCHNYI INSTITUT (TsNIGRI)

(Central Scientific Research Institute for Geological Surveying)
Moskva, Varshavskoe shosse 178; tel. V4-63-45.

*i.e. Main division for housing and civilian construction in the city of Moscow --- translator.

** Administration for engraving state bank notes and for minting coins and medals --- translator.

INSTITUT GORYUCHIKH ISKOPAEMYKH (IG AN SSSR)

(Institute of Mineral Fuels (of the AS USSR))
Moskva, Leninskii prosp. 29; tel V2-43-04.

NAUCHNO-ISSLED. INSTITUT GRADOSTROITEL'STVA I RAIONNOI PLANIROVKI

(Scientific Research Institute for Town Building and Regional Planning)
Moskva, Dmitrovskoe shosse 9; tel. 16-15-26.

GOSUDARSTVENNYI NAUCHNO-ISSLED. INSTITUT GRAZHDANSKOGO VOZDUSHNOGO FLOTA SSSR (Gos. NII GVF)

(State Scientific Research Institute for Civil Aviation of the USSR)
Moskva, Volokolamskoe shosse 73; tel. D8-02-83.

INSTITUT GRUDNOI KHIRURGII

(Institute for Chest Surgery)
Moskva, Leninskii prosp. 8; tel. V3-21-51.

TSENTR. NAUCHNO-ISSLED. DEZINFEKTSIONNYI INSTITUT (TsNIDI)

(Central Scientific Research Institute for Disinfection)
Moskva, Miusskaya pl. 3/8; tel. D1-17-22.

NAUCHNO-ISSLED. INSTITUT DEREVOOBRABATYVAYUSHCHEGO MASHINOSTROENIYA (NIIDrevmash)

(Scientific Research Institute for Woodworking Machinery)
Moskva B, Pochtovaya ul. 36; tel. E1-16-73.

NAUCHNO-ISSLED. INSTITUT DEFEKTOLOGII (NIID APN RSFSR)

(Scientific Research Institute for Defectology (of the Academy of Pedagogical sciences of the RSFSR))
Moskva, Pogodinskaya ul. 8; tel. G5-04-52.

GOS. VSES. DOROZHNYI NAUCHNO-ISSLED. INSTITUT (SOYUZDORNII)

(State All-Union Scientific Research Institute for Roads)
Moskva, Sofiiskaya nab. 34; tel. V1-40-80.

VSES. NAUCHNO-ISSLED. INSTITUT ZHELEZNODOROZHNOGO TRANSPORTA (TsNII MPS*)

(All-Union Scientific Institute for Railway Transport)
Moskva, 3-ya Mytishchinskaya ul. 10; tel. I1-36-20.

NAUCHNO-ISSLED. INSTITUT ZHELEZOBETONNYKH IZDELII I NERUDNYKH MATERIALOV (NIIZhelezobetona)

(Scientific Research Institute for Reinforced Concrete Products and Non-metallic Materials)
Moskva, 2-i Khoroshevskii pr. 9; tel. D5-27-92.

NAUCHNO-ISSLED. INSTITUT ZHELEZOBETONOV I BETONOV (NIIZhB)

(Scientific Research Institute for Concretes and Reinforced Concretes)
st. Plyushchevo, M.-Ryazanskoi zh. d., pos. Vyazovka; tel. Zh2-09-38.

VSES. NAUCHNO-ISSLED. INSTITUT ZHIVOTNOVODSTVA (VIZh)

(All-Union Scientific Research Institute for Cattle Breeding)
Moskva, ul. 8 Marta 3; tel. komm. D3-05-55.

VSES. NAUCHNO-ISSLED. INSTITUT ZHIVOTNOGO SYR'YA I PUSHNINY (VNIIZhP)

(All-Union Scientific Research Institute of Animal Products and Furs)
Moskva, Dmitrovskoe shosse 11; tel. I6-07-52.

NAUCHNO-ISSLED. INSTITUT ZHILISHCHA

(Scientific Research Institute for Housing)
Moskva, Dmitrovskoe shosse 9; tel. I6-16-53.

VSES. NAUCHNO-ISSLED. INSTITUT ZHIROV, MOSKOVSKII FILIAL (MF VNIIZh)

(All-Union Scientific Research Institute for Fats, Moscow branch)
Moskva, Balakirevskii p. 1; tel. E1-80-11.

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* i.e. MINISTERSTVO PUTEI SOOBSHCHENIYA (MPS) (Ministry of railroads) --- translator.

VSES. NAUCHNO-ISSLED. INSTITUT ZVUKOZAPISI (VNAIZ)

(All-Union Scientific Research Institute for Sound Recording)
Moskva, ul. Kachalova 24; tel. K5-42-88.

NAUCHNO-ISSLED. INSTITUT ZEMLEDELIYA TSENTRAL'NYKH RAIONOV NECHERNOZEMNOI POLOSY

(Scientific Research Institute for Agriculture in Central Regions of the Non-chernozem belt)
st. Nemchinovka, Kalininskoi zh. d; tel. G9-74-30.

VSES. NAUCHNO-ISSLED. INSTITUT ZERNA I PRODUKTOV EGO PERERABOTKI (VNIIZ)

(All-Union Scientific Research Institute for Grain and Grain Products)
Moskva, Dmitrovskoe shosse 11; tel. komm. I6-00-10.

NAUCHNO-ISSLED. INSTITUT IGRUSHKI (NII)

(Scientific Research Institute for Toys)
g. Zagorsk, Mosk. obl., prosp. Krasnoi Armii 136;
tel. 00, Zagorsk, 4-72.

TSENTR. INSTITUT INFORMATSII TSVETNOI METALLURGII (TsIITsvetmet)

(Central Institute of Information for Non-ferrous Metallurgy)
Moskva, prosp. Mira 101; tel. komm. I1-10-30, dob. 6-78.

TSENTR. INSTITUT INFORMATSII CHERNOI METALLURGII (TSIIN ChM)

(Central Institute of Information for Ferrous Metallurgy)
Moskva, 2-i Obydenskii p. 14; tel. G6-57-43.

VSES. NAUCHNO-ISSLED. INSTITUT ISKUSSTVENNOGO VOLOKNA (VNIIV)

(All-Union Scientific Research Institute for Synthetic Fibres)
g. Mytishchi, Mosk. obl., ul. Kolontsova 5; tel. I1-83-64.

INSTITUT ISTORII

(Institute of History)
Moskva, Volkhonka 14; tel. B3-77-41.

INSTITUT ISTORII ESTESTVOZNANIYA I TEKHNIKI (IESTEKh)

(Institute of the History of Natural Science and Technology)
Moskva, Novaya pl. 3/4; tel. B8-11-90.

INSTITUT ISTORII ISKUSSTV

(Institute of Art History)
Moskva, Podsosenskii p. 21; tel. B7-19-93.

INSTITUT ISTORII MATERIAL'NOI KUL'TURY (IIMK)

(Institute of the History of Material Culture)
Moskva, p. Sadovskikh 2; tel. D3-11-40.

INSTITUT ISTORII PARTII MK I MGK KPSS

(Institute for the History of the Moscow (province) Committee and Moscow City Committee of the Communist party of the Soviet Union)
Moskva, Strastnoi bul. 11; tel. K5-23-72.

NAUCHNO-ISSLED. INSTITUT KARTOFEL'NOGO KHOZYAISTVA NIIKKh)

(Scientific Research Institute for Potato Farming)
platf. Korenevo, M-Ryazanskoi zh. d., der. Korenevo; tel. komm. Zh2-21-00, dob. "Institut kartofel'nogo khozyai'stva"

NAUCHNO-ISSLED. KINO-FOTO INSTITUT (NIKFI)

(Scientific Research Institute for Cinephotography)
Moskva, Leningradskii prosp. 47; tel. D7-29-23.

INSTITUT KITAEVEDENIYA

(Institute of Chinese Studies (sinology))
Moskva, Kitaiskii pr. 7; tel. B6-82-00.

MOSK. OBL. NAUCHNO-ISSLED. KLINICHESKII INSTITUT im. M. F. VLADIMIRSKOGO (MONIKI)

("M. F. Vladimirskii" Moscow Province Clinical Scientific Research Institute)
Moskva, 3-ya Meshchanskaya ul. 61/2; tel. I1-25-95.

TSENTR. NAUCHNO-ISSLED. INSTITUT KOZHEVENNO-OBUVNOI PROMYSHLENNOSTI (TsNIIKP)

(Central Scientific Research Institute for the Leather and Footwear Industry)
Moskva, Pyatnitskaya ul. 74; tel. V1-84-89.

VSES. NAUCHNO-ISSLED. INSTITUT ISKUSSTVENNOI KOZHI (VNIIK)

(All-Union Scientific Research Institute for Synthetic Leather)
Moskva, Luzhnikovskaya ul. 11; tel. V3-23-55.

TSENTR. KOZHNO-VENEROLOGICHESKII INSTITUT (TsKVI)

(Central Institute for Skin and Venereal Diseases)
Moskva, ul. Korolenko 3; tel. E3-16-03.

VSES. NAUCHNO-ISSLED. INSTITUT KOMITETA STANDARTOV MER I IZMERITEL'NYKH PRIBOROV (VNIIKSMIP)

(All-Union Scientific Research Institute of the Committee of Standards, Measures and Measuring Instruments)
Moskva, ul. Shchuseva 4; tel. K4-45-59.

TSENTR. NAUCHNO-ISSLED. INSTITUT KOMPLEKSNOI AVTOMATIZATSII (TsNIIKA)

(Central Scientific Research Institute for Complex Automation)
Moskva, Ol'khovskaya ul. 25; tel. K4-48-61.

INSTITUT KOMPLEKSNYKH TRANSPORTNYKH PROBLEM (IKTP)

(Institute of Complex Transport Problems)
Moskva, Nizhn. Krasnosel'skaya ul. 39; tel. E1-57-68.

VSES. NAUCHNO-ISSLED. INSTITUT KONDITERSKOI PROM-STI (VKNII)

(All-Union Scientific Research Institute for the Confectionery Industry)
Moskva, Elektrozavodskaya ul. 20; tel. E3-34-26.

VSES. NAUCHNO-ISSLED. INSTITUT KONEVODSTVA (VNIIK)

(All-Union Scientific Research Institute of Horsebreeding)
Moskva, Skakovaya alleya 11; tel. D3-28-61.

VSES. NAUCHNO-ISSLED. INSTITUT KONSERVNOI I OVOSHCHESUSHIL'NOI PROM-STI (VNIIKOP)

(All-Union Scientific Research Institute for the Canning and Dried Fruit Industry)
Moskva, Novoslobodskaya ul. 7; tel. D1-25-60.

GOS. NAUCHNO-KONTROL'NYI INSTITUT VETERINARNYKH PREPARATOV (GNKI)

(State Scientific Control Inst. for Veterinary Preparations)
Moskva, Zvenigorodskoe shosse 5; tel. D2-24-83.

GOS. KONTROL'NYI INSTITUT SYVOROTOK I VAKTSIN im. L.A. TARASEVICHA (GKISV)

("L.A. Tarasevich" State Control Inst. for Sera and Vaccines)
Moskva, Sivtsev Vrazhek 41; tel. G1-39-22.

NAUCHNO-ISSLED. KON'YUNKTURNYI INSTITUT (NIKI MVT)

(Scientific Research Institute of Conjunctiva)
Moskva, Babushkin p. 4; tel. E1-97-57.

VSES. NAUCHNO-ISSLED. INSTITUT KORMOV im. V.R. VIL'YAMSA

("V.R. Vil'yams" All-Union Scientific Research Institute for Fodder)
st. Lugovaya, Severnoi zh.d., Savelovskii vokzal;
tel. 00, Lobnya, dob. "Institut kormov"

TSENTR. NAUCHNO-ISSLED. INSTITUT KRAKHMALOPATOCHNOI PROM-STI (TsNIIKPP)

(Central Scientific Research Institute for the Starch and Molasses Industry)
platf. Korenevo, M.-Ryazanskoi zh. d. *

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* no telephone number given ---- translator.

VSES. NAUCHNO-ISSLED. INSTITUT KRIMINALISTIKI (VNIIK)

(All-Union Scientific Research Institute for Criminology)
Moskva, Kutuzovskii prosp. 27; tel. G9-39-27.

INSTITUT KRISTALLOGRAFII

(Institute of Crystallography)
Moskva, Pyzhevskii p. 3; tel. V1-57-89.

NAUCHNO-ISSLED. INSTITUT KROLIKOVODSTVA I PUSHNOGO ZVEROVODSTVA (NIIKZ)

(Scientific Research Institute of Rabbit-Breeding and Fur-Producing Animals)
st. Udel'naya, M.-Ryazanskoi zh.d; tel. komm. Zh2-21-00, dob. 30.

GOS. NAUCHNO-ISSLED. INSTITUT KURORTOLOGII I FIZIOTERAPII

(State Scientific Research Institute for Health Resorts and Physiotherapy)
Moskva, Kutuzovskii prosp. 4; tel. D2-18-83.

VSES. NAUCHNO-ISSLED. INSTITUT LEKARSTVENNYKH I AROMATICHESKIKH RASTENII (VILAR)

(All-Union Scientific Research Institute for Medicinal and Aromatic Herbs)
st. Bittsa, M.-Kursko-Donbasskoi zh.d; tel. V4-61-02.

INSTITUT LESA

(Forestry Institute)
Moskva, ul. Gerstena 6, Komn. 8; tel. B9-56-05.

VSES. NAUCHNO-ISSLED. INSTITUT LESOVODSTVA I MEKHANIZATSII LESNOGO KHOZYAISTVA (VNIILM)

(All-Union Scientific Research Institute for Forestry and the Mechanization of Timber-Production)
g. Pushkino, Moskovskaya obl., Pisarevskaya ul. 12;
tel. 00, Pushkino, dob. 3-49.

TSENTR. NAUCHNO-ISSLED. LESOKHIMICHESKII INSTITUT (TsNILKhI)

(Central Scientific Research Institute for Timber Chemistry)
g. Khimki, Moskovskaya obl., Leningradskoe shosse 28;
tel. D8-04-91.

NAUCHNO-ISSLED. INSTITUT LITEINOGO MASHINOSTROENIYA I LITEINOE TEKHNOLOGII (NIILitmash)

(Scientific Research Institute for Foundry Machinery and Foundry Technology)
Moskva, Rastorguevskii p. 14; tel. D2-27-25.

INSTITUT MIROVOI LITERATURY im. A. M. GORKOGO

("A. M. Gorkii" Institute of World Literature)
Moskva, ul. Vorovskogo 25a; tel. K4-50-30.

TSENTR. NAUCHNO-ISSLED. INSTITUT PROMYSHLENNOSTI LUBYANYKH VOLOKON (TsNIILV)

(Central Scientific Research Institute of the Bast Fibre Industry)
Moskva, Sirotskii p. 6; tel. V2-21-07.

INSTITUT MALYARII, MEDITSINSKOI PARAZITOLOGII I GEL'MINTOLOGII

(Institute of Malaria, Medical Parasitology and Helminthology)
Moskva, Pogodinskaya ul. 10; tel. G6-49-36.

INSTITUT MARKSIZMA-LENINIZMA pri TsK KPSS

(Institute of Marxism-Leninism at the Central Committee of the Communist Party of the Soviet Union)
Moskva, ul. Marksa i Engel"sa 5; tel. komm. K4-10-30.

MATEMATICHESKII INSTITUT im. V. A. STEKLOVA (MIAN)

("V. A. Steklov" Mathematical Institue)
Moskva, 1-i Akademicheskii pr. 28; tel. V5-27-91.

INSTITUT MASHINOVEDENIYA (IMash AN SSSR)

(Institute of Machine Construction (of the AS USSR))
Moskva, M. Khariton'evskii p. 4; tel. K4-98-00.

VSES. NAUCHNO-ISSLED. INSTITUT MEDITSINSKOGO INSTRUMENTARIYA I OBORUDOVANIYA (VNIIMIO)

(All-Union Scientific Research Institute of Medical Instruments and Equipment)
Moskva, Staroe shosse 10a; tel. komm. D0-00-23, dob. 3-85.

INSTITUT MERZLOTOVEDENIYA im. V. A. OBRUCHEVA (INMERO)

("V. A. Obruchev" Institute for the Study of Frozen Soil
Moskva B, Cherkasskii p. 2/10; tel. B8-26-36.

RESPUBLIKANSKII NAUCHNO-ISSLED. INSTITUT MESTNYKH STROITEL'NYKH MATERIALOV (ROSNIIMS)

(Republic Scientific Research Institute of Local Building Materials of the RSFSR)
Moskva, Petrovka 14; tel. B1-21-21.

EKSPERIMENTAL'NYI NAUCHNO-ISSLED. INSTITUT METALLOREZHUSHCHIKH STANKOV (ENIMS)

(Experimental Scientific Research Institute for Metal-Cutting Machines)
Moskva, 5-i Donskoi pr. 21b; tel. V2-39-63.

INSTITUT METALLURGII im. A. A. BAIKOVA (IMET AN SSSR)

("A. A. Baikov" Institute of Metallurgy (of the AS USSR))
Moskva, Leninskii prosp. 49; tel. komm. V5-00-02

NAUCHNO-ISSLED. INSTITUT METODOV OBUCHENIYA (NII metodov obucheniya)

(Scientific Research Institute of Teaching Methods)
Moskva, Lobkovskii p. 5/16; tel. K7-79-82.

TSENTR. NAUCHNO-ISSLED. INSTITUT MEKHANIZATSII I ENERGETIKI LESNOI PROMYSHLENNOSTI (TsNIIME)

(Central Scientific Research Institute of Mechanization and Power-Supply for the Forestry Industry)
g. Khimki, Mosk. obl., Leningradskoe shosse 21;
tel. D0-58-47.

VSES. NAUCHNO-ISSLED. INSTITUT MEKHANIZATSII SEL'SKOGO KHOZYAISTVA (VIM)

(All-Union Scientific Research Institute for the Mechanization of Agriculture)
st. Plyushchevo, M.-Ryazanskoi zh. d; tel. komm. Zh2-06-17.

INSTITUT MEKHANIKI (IMEKh AN SSSR)

(Institute of Mechanics (of the AS USSR))
Moskva, Leningradskii prosp. 7; tel. D1-52-08.

TSENTR. NAUCHNO ISSLED. INSTITUT MEKHANICHESKOI OBRABOTKI DEREVA (TsNIIMOD)

(Central Scientific Research Institute for the Mechanization of Woodworking)
g. Khimki, Mosk. obl., Leningradskoe shosse; tel. D3-73-27.

NAUCHNO-ISSLED. INSTITUT MEKHOVOI PROMYSHLENNOSTI (NIIMP)

(Scientific Research Institute of the Fur Industry)
Moskva, ul. Osipenko 71; tel. V1-36-18.

INSTITUT MIKROBIOLOGII (INMI)

(Institute of Microbiology)
Moskva, Leninskii prosp. 33; tel. V2-30-85.

INSTITUT MIROVOI EKONOMIKI I MEZHDUNARODNYKH OTNOSHENII (IMEMO)

(Institute of World Economics and International Relations)
Moskva, Kitaiskii pr. 7; tel. K5-06-09.

NAUCHNO-ISSLED. INSTITUT MOZGA

(Scientific Research Institute for the Brain)
Moskva, p. Obukha 5; tel. K7-80-07.

VSES. NAUCHNO-ISSLED. INSTITUT MOLOCHNOI PROMYSHLENNOSTI (VNIMI)

(All-Union Scientific Research Institute for the Milk Industry)
Moskva, Lyusinovskaya ul. 35; tel. V1-13-26.

VSES. NAUCHNO-ISSLED. INSTITUT MORSKOGO RYBNOGO KHOZYAISTVA I OKEANOGRAFII (VNIRO)

(All-Union Scientific Research Institute of Sea Fisheries and Oceanography)
Moskva, Verkhn. Krasnosel'skaya ul. 17; tel. E1-83-86.

INSTITUT MORFOLOGII ZHIVOTNYKH im. A.N. SEVERTSOVA (IMZh AN SSSR)

("A.N. Severtsov" Institute of Morphology of Animals (of the AS USSR))
Moskva, Leninskii prosp. 33; tel. V2-26-05.

NAUCHNO-ISSLED. INSTITUT MUZEEVEDENIYA

(Scientific Research Institute for Museums)
Moskva, Bersenevskaya nab. 22; tel. V1-60-85.

VSES. NAUCHNO-ISSLED. INSTITUT MYASNOI PROMYSHLENNOSTI (VNIIMP)

(All-Union Scientific Research Institute for the Meat Industry)
Moskva, ul. Talalikhina 26; tel. Zh1-10-10.

TSENTR. INSTITUT NAUCHNOI INFORMATSII PO STROITEL'STVU I ARKHITEKTURE (TsINIS)

(Central Institute of Scientific Information on Building and Architecture)
Moskva, pr. Khudozhestvennogo teatre 2; tel. B9-57-32.

VSES. INSTITUT NAUCHNOI TEKHNICHESKOI INFORMATSII AKADEMII NAUK SSSR (VINITI)

(All-Union Institute of Scientific and Technical Information of the AS USSR)
Moskva, Baltiiskii pos. 42b; tel. komm. D7-00-10.

GOS. NAUCHNO-ISSLED. INSTITUT NAUCHNOI I TEKHNICHESKOI INFORMATSII GOS. NAUCHNO-TEKHNICHESKOGO KOMITETA SOVETA MINISTROV RSFSR (Gos. INTI)

(State Scientific Research Institute of Scientific and Technical Information of the State Scientific Technical Committee of the Council of Ministers of the RSFSR)
Moskva, 1-i Khvostov p.13; tel. V3-45-51.

NAUCHNO-ISSLED. INSTITUT NATSIONAL'NYKH SHKOL

(Scientific Research Institute of National Schools)
Moskva, Pogodinskaya ul. 8; tel. G5-04-92.

INSTITUT NEVROLOGII

(Institute of Neurology)
Moskva, Shchipok 6/8; tel. V1-38-76

ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT NEIROKHIRURGII im. Akad. N.N. BURDENKO

("Academician N.N. Burdenko" Institute of Neurology, Order of the Red Banner of Labour)
Moskva, 5-ya Tverskaya-Yamskaya ul. 5; tel. D1-31-97.

VSES. NAUCHNO-ISSLED. NEFTEGAZOVYI INSTITUT (VNIINeft')

(All-Union Scientific Research Institute for Petroleum Gas)
Moskva, 1-i Dmitrovskii pr. 10; tel. komm. D0-00-23.

INSTITUT NEFTI (INefti AN SSSR)

(Institute for Petroleum (of the AS USSR))
Moskva, Leninskii prosp. 29; tel. komm. V1-90-33.

NAUCHNO-ISSLED. INSTITUT NOVYKH STROITEL'NYKH MATERIALOV, OTDELKI I OBORUDOVANIYA ZDANII (NIINStroimaterialov)

(Scientific Research Institute for New Building Materials, Finishes and Fittings for Buildings)
Moskva, 2-i Verkhn. Mikhailovskii pr. 5; tel. V2-51-03.

VSES. NAUCHNO-ISSLED. I PROEKTNO-KONSTRUKTORSKII INSTITUT PO OBOGASHCHENIYU I BRIKETIROVANIYU UGLEI (VNIIUgleobogashchenie)

(All-Union Scientific Research and Designing-Constructing Institute for Coal Concentration and Briquetting)
g. Lyubertsy, Mosk. pos. VUGI *; tel. Zh2-62-65.

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* i.e. VSESOYUZNYI NAUCHNO-ISSLED. UGOL'NYI INSTITUT (VUGI)
(All-Union Coal Scientific Research Institute) --- translator.

INSTITUT OBSHCHEI I NEORGANICHESKOI KHIMII im. N. S. KURNAKOVA (IONKh)

("N. S. Kurnakov" Institute of General and Inorganic Chemistry)
Moskva, Leninskii prosp. 31; tel. V2-07-87.

NAUCHNO-ISSLED. INSTITUT OBSHCHESTVENNYKH ZDANII I SOORUZHENII

(Scientific Research Institute for Communal Buildings and other Structures)
Moskva, Dmitrovskoe shosse 9; tel. I6-03-93.

NAUCHNO-ISSLED. INSTITUT OVOSHCHNOGO KHOZYAISTVA (NIIOKh)

(Scientific Research Institute for Vegetable Growing)
st. Perlovskaya Severnoi zh. d., pos. Grachi; tel. komm. I1-00-10 dob. 2-70.

GOS. OKEANOGRAFICHESKII INSTITUT (GOIN)

(State Oceanographic Institute)
Moskva, Kropotkinskii p. 6: tel. G6-84-06.

INSTITUT OKEANOLOGII

(Institute of Oceanology)
Moskva, Luzhnikovskaya ul. 8; tel. V1-65-55.

GOS. NAUCHNO-ISSLED. ONKOLOGICHESKII INSTITUT im. P. A. GERTSENA (GOI)

("P. A. Gertsen" State Scientific Research Institute for Oncology)
Moskva, 2 -i Botkinskii pr. 3; tel. D1-27-23.

INSTITUT ORGANIZATSII ZDRAVOOKHRANENIYA I ISTORII MEDITSINY im. N. A. SEMASHKO

("N. A. Semashko" Institute of Public Health Organization and the History of Medicine)
Moskva, Kutuzovskii prosp. 4; tel. D2-20-60.

NAUCHNO-ISSLED. INSTITUT ORGANIZATSII MEKHANIZATSII I TEKHNICHESKOI POMOSHCHI STROITEL'STVU (NIIOMTP)

(Scientific Research Institute for Organization, Mechanization and Technical Aids in Building)
Moskva, Dmitrovskoe shosse 9; tel. I6-03-04.

NAUCHNO-ISSLED. INSTITUT ORGANICHESKIKH POLUPRODUKTOV I KRASITELEI im. K.E. VOROSHILOVA (NIOPIK)

("K.E. Voroshilov" Scientific Research Institute for Organic Semi-products and Dyestuffs)
Moskva, B, Sadovaya ul. 1/7; tel. D1-31-00.

ORGSTANKINPROM (GOS. PROEKTNO-TEKHNOLOGICHESKII I EKSPERIMENTAL'NYI INSTITUT)

(State Institute for Design Technology and Experiments (for the machine tool industry))
Moskva, ul. Kuibysheva 4; tel. K4-87-80.

ORGSTROI (GOS. INSTITUT PO VNEDRENIYU PEREDOVYKH METODOV RABOT I TRUDA V STROITEL'STVE) MINISTERSTVA STROITEL'STVA RSFSR

(State Institute for the Introduction of Advanced Working and Operating Methods in Building, Ministry of Building, RSFSR)
Moskva, Garazhnaya ul. 2; tel. Zh4-33-10.

VSES. NAUCHNO-ISSLED. INSTITUT OKHRANY TRUDA (VNIIOT)

(All-Union Scientific Research Institute for Work Safety)
Moskva, Obolenskii p.10; tel. G6-47-30.

PALEONTOLOGICHESKII INSTITUT (PIN)

(Palaeontological Institute)
Moskva, Leninskii prosp. 33; tel. V2-38-44.

ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT PEDIATRII

(Pediatric Institute, Order of the Red Banner of Labour)
Moskva, Ust'inskii pr. 1/2; tel. K7-44-85.

GOS. NAUCHNO-ISSLED. PEDIATRICHESKII INSTITUT G. MOSKVY

(State Scientific Research Institute of Pediatrics of the City of Moscow)
Moskva, Kropotkinskaya ul. 37; tel. G6-69-61.

VSES. NAUCHNO-ISSLED. INSTITUT PO PERERABOTKE NEFTI I GAZOV I POLUCHENIYU ISKUSSTVENNOGO ZHIDKOGO TOPLIVA (VNIINP)

(All-Union Scientific Research Institute for the Processing of Oil and Gases and the Production of Synthetic Liquid Fuel)
Moskva, Aviamotornaya ul. 6; tel. E1-52-02.

VSES. NAUCHNO-ISSLED. INSTITUT PIVOVARENNOI PROMYSHLENNOSTI (VNIIPP)

(All-Union Scientific Research Institute of the Beer Brewing Industry)
Moskva, ul. Osipenko 14; tel. V1-35-27.

INSTITUT PITANIYA

(Institute of Nutrition)
Moskva, Pogodinskaya ul. 10; tel. G6-58-05.

VSES. NAUCHNO-ISSLED. INSTITUT PODZEMNOI GAZIFIKATSII UGLEI (VNIIPodzemgaz)

(All-Union Scientific Research Institute for Underground Gasification of Coal)
Moskva B, Serpukhovskaya ul. 10; tel. V1-46-83.

EKSPERIMENT.I NAUCHNO-ISSLED. INSTITUT PODSHIPNIKOVOI PROMYSHLENNOSTI (ENIIPP)

(Experimental and Scientific Research Institute of the Bearing Industry)
Moskva, 2-ya ul. Mashinostroeniya 17/9; tel. Zh2-50-25.

VSES. NAUCHNO-ISSLED. INSTITUT POD'EMNO-TRANSPORTNOGO MASHINOSTROENIYA (VNIIPTMash)

(All-Union Scientific Research Institute for Lifting and Transport Equipment)
Moskva, Kuibyshevskii pr. 6; tel. K5-57-05.

NAUCHNO-ISSLED. INSTITUT POLIGRAFICHESKOGO MASHINOSTROENIYA (NIIPoligrafmash)

(Scientific Research Institute of Printing Machinery)
Moskva, M, Kaluzhskii p. 4; tel. V2-39-40.

VSES. NAUCHNO-ISSLED. INSTITUT POLIGRAFICHESKOI PROMYSHLENNOSTI I TEKHNIKI (VNIIPIT)

(All-Union Scientific Research Institute of the Printing Industry and its Technology)
Moskva, ul. Chekhova 18a; tel. B8-14-00.

POCHVENNYI INSTITUT im. V. V. DOKUCHAEVA (IP AN SSSR)

("V. V. Dokuchaev" Soil Science Institute (of the AS USSR))
Moskva, Pyzhevskii p. 7; tel. V1-50-37.

MOSKOVSKII NAUCHNO-ISSLED. INSTITUT PREPARATOV PROTIV POLIOMIELITA

(Moscow Scientific Research Institute for Anti-poliomyletis Preparations)
Moskva, 1 - ya Dubrovskaya ul. 15; tel. Zh2-18-27.

INSTITUT PO IZUCHENIYU POLIOMIELITA

(Institute for the Study of Poliomyelitis)
Moskva, 8-ya ul. Sokolinoi gory 15, korp. 2; tel. E1-13-06.

INSTITUT PRAVA im. A. Ya. VYSHINSKOGO

("A. Ya. Vyshinskii" Institute of Law)
Moskva, ul. Frunze 10; tel. B3-98-16.

INSTITUT PRIKLADNOI GEOFIZIKI (IPG AN SSSR)

(Institute of Applied Geophysics (of the AS USSR))
Moskva, Glebovskaya ul. 20 b; tel. E3-50-48.

VSES. NAUCHNO-ISSLED. INSTITUT PRIRODNYKH GAZOV (VNIIGAZ)

(All-Union Scientific Research Institute for Natural Gases)
Moskva, 1-i Dmitrovskii pr. 10; tel. komm. DO-00-23. dob. 5-50.

VSES. TsENTR. NAUCHNO-ISSLED. INSTITUT PROBLEM PROIZVODSTVA STROITEL'NYKH MATERIALOV NA BAZE TONKOGO IZMEL'CHENIYA (VNIITISM)

(All-Union Central Scientific Research Institute for Problems of the Productions of Building Materials based on Fine Aggregates)
Moskva, 2-i Verkhn. Mikhailovskii pr. 5; tel. V2-31-89.

TSENTR. INSTITUT PROGNOZOV (TsIP)

(Central Weather-Forecasting Institute)
Moskva, Bol'shevistskaya ul. 13; tel. D2-25-83.

NAUCHNO-ISSLED. INSTITUT PRODOVOL'STVENNOGO MASHINOSTROENIYA (NIIProdmash)

(Scientific Research Institute for Food Machinery)
Moskva, ul. Durova 37; tel. I1-20-98.

NAUCHNO-ISSLED. INSTITUT PROMYSHLENNOI I SANITARNOI OCHISTKI GAZOV (NIIOGaz)

(Scientific Research Institute for Industrial and Sanitary Gas Purification)
Moskva, ul. Chkalova 50; tel. K7-04-82.

TSENTR. NAUCHNO-ISSLED. INSTITUT PROTEZIROVANIYA I PROTEZOSTROENIYA (TsNIIPP)

(Central Scientific Research Institute for Prosthesis and the Manufacture of Prosthetic Appliances)
Moskva, 2-i Donskoi pr. 4-a; tel. V2-20-87.

VSEROS. NAUCHNO-ISSLED. INSTITUT PRUDOVOGO RYBNOGO KHOZYAISTVA (VNIPRKh)

(All-Russian Scientific Research Institute of Pond Fisheries)
Moskva, Khlebnikov p. 9; tel. Zh1-32-48.

GOS. NAUCHNO-ISSLED. INSTITUT PSIKHIATRII MINISTERSTVA ZDRAVOOKHRANENIYA RSFSR.

(State Scientific Research Psychiatric Institute of the Ministry of Health of the RSFSR)
Moskva, Poteshnaya ul. 3; tel. E3-39-67.

NAUCHNO-ISSLED. INSTITUT PSIKHIATRII MINISTERSTVA ZDRAVOOKHRANENIYA SSSR

(Scientific Research Psychiatric Institute of the Ministry of Health of the USSR)
Moskva, Zagorodnoe shosse 2; tel. V2-24-23.

NAUCHNO-ISSLED. INSTITUT PSIKHOLOGII

(Scientific Research Institute of Psychology)
Moskva, Mokhovaya ul. 9, korp. "V"; tel. B3-68-76.

NAUCHNO-ISSLED. INSTITUT PTITSEVODSTVA (NIIP)

(Scientific Research Institute of Poultry Farming)
g. Zagorsk, Mosk. obl., Ptitsegrad; tel. 00, Zagorsk, Ptitsegrad, "Institut Ptitsevodstva".

VSES. NAUCHNO-ISSLED. INSTITUT PTITSEPERERABATYVAYUSHCHEI PROMYSHLENNOSTI (VNIIP)

(All-Union Scientific Research Institute for the Poultry Processing Industry)
Moskva, Dmitrovskoe shosse 13a; tel. I6-07-40.

INSTITUT EKSPERIMENTAL'NOI TERAPII I PATOLOGII RAKA

(Institute of Experimental Therapy and Pathology of Cancer)
Moskva, 3-ya Meshchanskaya ul. 61/2, 9-i korp.; tel. I1-13-46.

GOS. NAUCHNO-ISSLED. INSTITUT REVMATIZMA

(State Scientific Research Institute for Rheumatism)
Moskva, Petrovka 25; tel. K4-63-50.

NAUCHNO-ISSLED. INSTITUT REZINOVOI PROM-STI (NIIRP)

(Scientific Research Institute of the Rubber Industry)
Moskva, M, Trubetskaya ul. 28; tel. komm. G6-45-80.

GOS. SOYUZNYI NAUCHNO-ISSLED. TEKHNOLOGICHESKII INSTITUT REMONTA I EKSPLUATATSII TRAKTOROV I SEL'SKO-KHOZYAISTVENNYKH MASHIN (GOSNITI)

(State Union Scientific Research Technological Institute for the Maintenance and Operation of Tractors and Agricultural Machines)
st. Plyushchevo, M. -Ryazanskoi zh.d.; tel. Zh2-17-06.

NAUCHNO-ISSLED. INSTITUT RENTGENOLOGII I RADIOLOGII

(Scientific Research Institute for X-rays and Radiology)
Moskva, Solyanka 7; tel. K7-17-30.

INSTITUT RUSSKOGO YAZYKA

(Institute of the Russian Language)
Moskva, Volkhonka 18/2; tel. G5-11-58.

MOSKOVSKII NAUCHNO-ISSLED. INSTITUT SANITARII I GIGIENY im. F. F. ERISMANA

("F. F. Erisman" Moscow Scientific Research Institute of Sanitation and Hygiene)
Moskva, Pyatnitskaya ul. 1/2; tel. V1-62-86.

TSENTR. NAUCHNO-ISSLED. INSTITUT SANITARNOGO PROSVESHCHENIYA

(Central Research Institute of Hygiene Education)
Moskva, ul. Kirova 42; tel. B1-02-34.

NAUCHNO-ISSLED. INSTITUT SANITARNOI TEKHNIKI (NIIST)

(Scientific Research Institute of Sanitary Technology)
Moskva, 6-ya ul., Oktyabr'skogo polya 9; tel. D4-12-25.

NAUCHNO-ISSLED. INSTITUT SEL'SKOGO STROITEL'STVA (NIISEL'STROI)

(Scientific Research Institute of Rural Building)
Moskva, Chapaevskii p. 16; tel. D7-33-62.

VSES. NAUCHNO-ISSLED. INSTITUT SEL'SKOKHOZYAISTVENNOGO MASHINOSTROENIYA (VISKhOM)

(All-Union Research Institute for Agricultural Machinery)
Pochtovoe otd. "Vagonoremont", Krasno-Polyanskogo raiona, Mosk. obl.; tel. I6-10-05.

VSES. NAUCHNO-ISSLED. INSTITUT SEL'SKOKHOZYAISTVENNOI MIKROBIOLOGII (VNIISel'skhozmikrobiologii), Mosk. otdelenie

(All-Union Scientific Research Institute of Agricultural Microbiology, Moscow division)
Moskva, Konyushkovskaya ul. 31; tel. D2-06-20.

VSES. NAUCHNO-ISSLED. INSTITUT SINTETICHESKIKH I NATURAL'NYKH DUSHISTYKH VESHCHESTV (VNIISNDV)

(All-Union Scientific Research Institute of Synthetic and Natural Aromatic Substances)
Selo Vorontsovo, Leninskogo raiona, Mosk. obl. *

MOSK. GOR. NAUCHNO-ISSLED. INSTITUT SKOROI POMOSHCHI im. SKLIFOSOVSKOGO

("Sklifosovkii" City of Moscow Scientific Research Institute of First Aid)
Moskva B, Kolkhoznaya pl. 3; tel. B1-15-97.

INSTITUT SLAVYANOVEDENIYA

(Institute of Slavonic Studies)
Moskva, Trubinkovskii p. 30a; tel. K5-78-70.

VSES. NAUCHNO-ISSLED. INSTITUT SPIRTOVOI I LIKERNO-VODOCHNOI PROM-STI (VNIISLVP)

(All-Union Scientific Research Institute for the Alcohol, Liqueur and Vodka Industry)
Moskva, Samokatnaya ul. 4b; tel. E1-66-52.

GOS. NAUCHNO-ISSLED. INSTITUT STEKLA (GNIIS)

(State Scientific Research Institute for Glass)
Moskva, B, Semenovskaya ul. 10; tel. E1-38-50.

VSES. NAUCHNO-ISSLED. INSTITUT STEKLYANNOGO VOLOKNA (VNIISV)

(All-Union Scientific Research for Glass Fibre)
Moskva, B, Semenovskaya ul. 32; tel. E1-32-32.

VSES. NAUCHNO-ISSLED. INSTITUT STROITEL'NOGO I DOROZHNOGO MASHINOSTROENIYA (VNII Stroidormash)

(All-Union Scientific Research Institute for Constructional and Road machinery)
Moskva, 2-ya Frunzenskaya ul. 8; tel. G6-30-61.

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* no telephone number given ----- translator

NAUCHNO-ISSLED. INSTITUT STROITEL'NOI KERAMIKI (NIIStroikeramiki)

(Scientific Research Institute for Ceramics in Building)
st. Kuchino, Gor'kovskoi zh.d.; tel. komm. Zh4-00-30, dob. 22.

NAUCHNO-ISSLED. INSTITUT STROITEL'NOI FIZIKI I OGRAZHDAYUSHCHIKH KONSTRUKTSII (NIISF)

(Scientific Research Institute for Constructional Physics and Protective Constructions)
Moskva, ul. Gor'kogo 38; tel. D1-35-10.

TSENTR. NAUCHNO-ISSLED. INSTITUT STROITEL'NYKH KONSTRUKSTSII (TsNIISK)

(Central Scientific Research Institute of Building Constructions)
st. Plyushchevo, M. -Ryazanskoi zh.d., pos. Vyazovka;
tel. Zh1-05-03.

NAUCHNO-ISSLED. INSTITUT PO STROITEL'STVU

(Scientific Research Institute for Building)
Moskva, Zemskii p. 5; tel. V1-11-66.

VSES. NAUCHNO-ISSLED. INSTITUT PO STROITEL'STVU MAGISTRAL'NYKH TRUBOPROVODOV (VNIIST)

(All-Union Scientific Research Institute for Pipeline Construction)
Moskva, Okruzhnoi pr. 19; tel. E5-25-41.

NAUCHNO-ISSLED. INSTITUT SUDEBNOI MEDITSINY

(Scientific Research Institute for Forensic Medicine)
Moskva, Sadovaya - Triumfal'naya ul. 13; tel. D1-02-63.

TSENTR. NAUCHNO-ISSLED. INSTITUT SUDEBNOI PSIKHIATRII im. prof. V. P. Serbskogo (TsNIISP im. Serbskogo)

("Prof. V. P. Serbskii" Central Scientific Research Institute for Forensic Psychiatry)
Moskva, Kropotkinskii p. 25; tel. G6-86-92.

VSES. NAUCHNO-ISSLED. INSTITUT TEKSTIL'NOGO I LEGKOGO MASHINOSTROENIYA (VNIILTEKMash)

(All-Union Scientific Research Institute for Textile and Light Machinery)
Moskva, Varshavskoe shosse 15; tel. V2-34-09.

NAUCHNO-ISSLED. INSTITUT TEORII I ISTORII ARKHITEKTURY

(Scientific Research Institute for Architectural Theory and History)
Moskva, ul. Gor'kogo 38; tel. D1-17-95.

NAUCHNO-ISSLED. INSTITUT TEORII I ISTORII IZOBRAZITEL'NYKH ISKUSSTV

(Scientific Research Institute for the Theory and History of the Descriptive Arts)
Moskva, Kropotkinskaya ul. 21; tel. G6-38-62.

NAUCHNO-ISSLED. INSTITUT TEORII I ISTORII PEDAGOGIKI

(Scientific Research Institute for the Theory and History of Pedogogics)
Moskva, Lobkovskii p. 5/16; tel. K7-63-04.

VSES. ORDENA TRUDOVOGO KRASNOGO ZNAMENI TEPLOTEKHNICHESKII INSTITUT im. F.E. DZERZHINSKOGO (VTI)

("F.E. Dzerzhinskii" All-Union Heat Engineering Institute, Order of the Red Banner of Labour)
Moskva, Leninskaya sloboda 23; tel. Zh5-34-83.

NAUCHNO-ISSLED. INSTITUT TEPLOENERGETICHESKOGO PRIBOROSTROENIYA (NII Teplopribor)

(Scientific Research Institute for Instruments for Heat Engineering)
Moskva, Ol'khovskaya ul. 27; tel. E1-34-83.

INSTITUT TERAPII

(Institute of Therapy)
Moskva B, Serpukhovskaya ul. 27; tel. V1-32-04.

TSENTR. INSTITUT TEKHNICHESKOI INFORMATSII UGOL'NOI PROM-STI (TsITIUglya)

(Central Institute of Technical Information for the Coal Industry)
Moskva, pr. Sapunova 13/15; tel. B8-45-94.

NAUCHNO-ISSLED. INSTITUT TEKHNOLOGII AVTOMOBIL'NOI PROM-STI (NIITAvtoprom)

(Scientific Research Institute of Technology of the Motor Industry)
Moskva, Ozerkovskaya nab. 22/24; tel. V1-82-38.

TSENTR. NAUCHNO-ISSLED. INSTITUT TEKHNOLOGII I MASHINOSTROENIYA (TsNIITMash)

(Central Scientific Research Institute of Technology and Machine Building)
Moskva, Sharikopodshipnikovskaya ul. 4; tel. komm. Zh1-90-07, dob. 1-09.

VSES. NAUCHNO-ISSLED. TEKHNOLOGICHESKII INSTITUT PRIBOROSTROENIYA (VNIITIPribor)

(All-Union Scientific Research Technological Institute of Instrument Making)
Moskva, Kholodil'nyi p. 1; tel. V2-10-41.

NAUCHNO-ISSLED. INSTITUT TORGOVLI I OBSHCHESTVENNOGO PITANIYA (NIITOP)

(Scientific Research Institute of Trade and Public Nutrition)
Moskva, ul. Kirova 47; tel. B1-91-12.

VSES. NAUCHNO-ISSLED. INSTITUT TORFYANOI PROM-STI (VNIITP)-Mosk. laboratoriya

(All-Union Scientific Research Institute for the Peat Industry - Moscow laboratory)
Moskva B, Vuzovskii p. 3/12; tel. K7-73-68.

TSENTR. NAUCHNO-ISSLED. INSTITUT TRAVMATOLOGII I ORTOPEDII (TsITO)

(Central Scientific Research Institute for Traumatology and Orthopaedics)
Moskva, Teplyi p. 16; tel. G6-88-76.

NAUCHNO-ISSLED. INSTITUT TEKHNOLOGII TRAKTORNOGO I SEL'SKOKHOZYAISTVENNOGO MASHINOSTROENIYA (NIITraktorsel'khozmash)

(Scientific Research Institute for the Technology of Tractors and Agricultural Machinery)
Moskva, Marksistskaya ul. 20; tel. Zh2-04-84.

GOS. SOYUZNYI NAUCHNO-ISSLED. TRAKTORNYI INSTITUT (NATI)

(State Union Scientific Research Institute for Tractors)
Moskva, Verkhnyaya ul. 34; tel. D1-88-29.

NAUCHNO-ISSLED. INSTITUT TRIKOTAZHNYI PROM-STI (NIITP)

(Scientific Research Institute for the Knitted Fabric Industry)
Moskva, ul. Fridrikha Engel'sa 56; tel. E1-89-25.

NAUCHNO-ISSLED. INSTITUT TRUDA (NIITruda)

(Scientific Research Institute of Labour)
Moskva, ul. Chkalova 34; tel. komm. B7-00-22.

INSTITUT TUBERKULEZA AKADEMII MEDITSINSKIKH NAUK SSSR

(Institute of Tubercolosis of the Academy of Medical Sciences of the USSR)
platf. Yauza., Severnoi zh. d; tel. E3-54-22; dispensary section - Yauzskii bul. 9; tel. K7-13-41.

GOS. NAUCHNO-ISSLED. INSTITUT TUBERKULEZA MINISTERSTVA ZDRAVOOKHRANENIYA RSFSR (GNIIT)

(State Scientific Research Institute for Tuberculosis of the Ministry of Health of the RSFSR)
Moskva, ul. Dostoevskogo 4; tel. I1-51-23.

VSES. NAUCHNO-ISSLED. I PROEKTNO-TEKHNOLOGICHESKII INSTITUT UGOL'NOGO MASHINOSTROENIYA (VNIIPTUglemash)

(All-Union Institute of Scientific Research and Design Technology for Coal Machinery)
Moskva, 8-ya Kozhukhovskaya ul. 7; tel. Zh5-38-64.

VSES. NAUCHNO-ISSLED. UGOL'NYI INSTITUT (VUGI)

(All-Union Scientific Research Institute for Coal)
st. Panki, M.-Ryazanskoi zh.d; tel. Zh2-23-51.

VSES. NAUCHNO-ISSLED. INSTITUT UDOBRENII I AGROPOCHVOVEDENIYA (VIUA)

(All-Union Scientific Research Institute for Fertilizers and Soil Science)
Moskva, ul. Pryanishnikova 31; tel. I6-01-75.

NAUCHNO-ISSLED. INSTITUT UDOBRENII I INSEKTOFUNGISIDOV im. Ya. V. SAMOILOVA (NIUIF)

("Ya. V. Samoilov" Scientific Research Institute for Fertilizers and Insectofungicides)
Moskva, Leninskii prosp. 55; tel. V5-18-31.

GOS. NAUCHNO-ISSLED. INSTITUT UKHA, GORLA I NOSA

(State Scientific Research Institute for the Ear , Throat and Nose)
Moskva, 2-i Botkinskii pr. 5, korp. 8; tel. D1-19-90.

INSTITUT FARMAKOLOGII I KHIMIOTERAPII

(Institute of Pharmacology and Chemical Therapy)
Moskva, Baltiiskii pos. 13; tel. D7-18-41.

INSTITUTE FIZIKI ATMOSFERY (IFA AN SSSR)

(Institute for the Physics of the Atmosphere (of the AS USSR))
Moskva B, Gruzinskaya ul. 10; tel. D2-02-04.

INSTITUT FIZIKI ZEMLI im. O. Yu. SHMIDTA

("O. Yu. Shmidt" Institute for the Physics of the Earth)
Moskva B, Gruzinskaya ul. 10; tel. D2-04-44.

VSES. NAUCHNO-ISSLED. INSTITUT FIZIKOTEKHNICHESKIKH I RADIOTEKHNICHESKIKH IZMERENII (VNIFTRI)

(All-Union Scientific Research Institute for Physicotechnical and Radiotechnical Measurement)
st. Kryukovo, Oktyabr'skoi zh. d; tel. E2-42-59.

ORDENA TRUDOVOGO KRASNOGO ZNAMENI NAUCHNO-ISSLED. FIZIKO-KHIMICHESKII INSTITUT im. L. Ya. KARPOVA

("L. Ya. Karpov" Scientific Research Institute for Physical Chemistry, Order of the Red Banner of Labour)
Moskva, ul. Obukha 10; tel. komm. B7-00-14. dob. 37.

INSTITUT NORMAL'NOI I PATOLOGICHESKOI FIZIOLOGII

(Institute of Normal and Pathological Physiology)
Moskva, Baltiiskii pos. 13; tel. D7-17-40.

INSTITUT FIZIOLOGII RASTENII im. K.A. TIMIRYAZEVA (IFR AN SSSR)

("K.A. Timiryazev" Institute of Plant Physiology (of the AS USSR))
Moskva, Leninskii prosp. 33; tel. V2-36-81.

NAUCHNO-ISSLED. INSTITUT FIZICHESKOGO VOSPITANIYA I SHKOL'NOI GIGIENY

(Scientific Research Institute of Physical Education and School Hygiene)
Moskva, Pogodinskaya ul. 8; tel. G5-04-33.

TSENTR. NAUCHNO-ISSLED. INSTITUT FIZICHESKOI KUL'TURY (TsNIIFK)

(Central Scientific Research Institute of Physical Culture)
Moskva, ul. Kazakova 18; tel. E1-80-86.

ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT FIZICHESKIKH PROBLEM im. S.I. VAVILOVA (IFP AN SSSR)

("S.I. Vavilov" Institute of Physical Problems (of the AS USSR), Order of the Red Banner of Labour)
Moskva, Vorob'evskoe shosse 2; tel. V2-32-48.

INSTITUT FILOSOFII

(Institute of Philosophy)
Moskva, Volkhonka 14; tel. K4-70-23.

NAUCHNO-ISSLED. FINANSOVYI INSTITUT (NIFI)

(Scientific Research Institute of Finance)
Moskva, ul. Kuibysheva 9; tel. K4-26-06.

VSES. NAUCHNO-ISSLED. KHIMIKO-FARMATSEVTICHESKII INSTITUT im. S. ORDZHONIKIDZE (VNIKhFI)

("S. Ordzhonikidze" All-Union Chemicopharmaceutical Scientific Research Institute)
Moskva, Zubovskaya ul. 7; tel. G6-97-68.

VSES. NAUCHNO-ISSLED. INSTITUT KHIMICHESKIKH REAKTIVOV (IREA)

(All-Union Scientific Research Institute of Chemical Reagents)
Moskva, Samokatnaya ul. 4a; tel. E1-29-26.

VSES. NAUCHNO-ISSLED. I KONSTRUKTORSKII INSTITUT KHIMICHESKOGO MASHINOSTROENIYA (NIIKhimmash)

(All-Union Scientific Research and Design Institute for Chemical Machinery)
Moskva B, Novodmitrovskaya ul. 14; tel. D3-62-65.

VSEROS. NAUCHNO-ISSLED. KHIMICHESKII INSTITUT PROM-STI MESTNOGO PODCHINENIYA (NIKhIMP)

(All-Russian Scientific Research Chemical Institute of Local Industry)
Moskva, Shabolovka 4; tel. V2-42-23.

INSTITUT KHIRURGII im. A. V. VISHNEVSKOGO

("A. V. Vishnevskii" Institute of Surgery)
Moskva B, Serpukhovskaya ul. 27; 5-i korp., tel. V1-22-67.

NAUCHNO-ISSLED. INSTITUT EKSPERIMENTAL'NOI KHIRURGICHESKOI APPARATURY I INSTRUMENTOV (NIIEKhA i I)

(Scientific Research Institute for Experimental Surgical Equipment and Instruments)
Moskva, Fabrichnaya liniya 6; tel. I1-86-57.

VSES. NAUCHNO-ISSLED. INSTITUT KHLEBOPEKARNOI PROM-STI (VNIIKhP)

(All-Union Scientific Research Institute of the Bread Baking Industry)
Moskva, Sokolovskaya ul. 51; tel. E3-27-82.

TSENTR. NAUCHNO-ISSLED INSTITUT KHLOPCHATOBUMAZHNOI PROM-STI (TsNIKhBI)

(Central Scientific Research Institute for the Cotton Industry)
Moskva, 5-i Donskoi pr. 14; tel. V2-31-42.

VSES. NAUCHNO-ISSLED. INSTITUT KHOLODIL'NOI PROM-STI im. A.I. MIKOYANA (VNIKhI)

("A.I. Mikoyan" All-Union Scientific Research Institute for the Refrigeration Industry)
Moskva, 1-i Astradamskii tup. 1a; tel. D1-86-44.

NAUCHNO-ISSLED INSTITUT KHUDOZHESTVENNOGO VOSPITANIYA

(Scientific Research Institute for Art Education)
Moskva, B, Sadovskikh 10; tel. B3-43-96.

NAUCHNO-ISSLED. INSTITUT KHUDOZHESTVENNOI PROM-STI (NIIKhP)

(Scientific Research Institute of the Art Industry)
Moskva, ul. Vorovskogo 31; tel. B3-45-90.

GOS. NAUCHNO-ISSLED. INSTITUT TSVETNYKH METALLOV (GINTsvetmet)

(State Scientific Research Institute for Non-ferrous Metals)
Moskva, ul. Durova 31; tel. I1-25-79.

TSENTR. NAUCHNO-ISSLED. INSTITUT TSELLYULOZNOI I BUMAZHNOI PROM-STI, MOSKOVSKII FILIAL (Mosfilial TsNIIB)

(Central Scientific Research Institute of the Cellulose (pulp) and Paper Industry, Moscow branch)
Moskva, ul. Razina 5; tel. B8-55-05.

VSES. GOS. NAUCHNO-ISSLED. INSTITUT TSEMENTNOI PROM-STI (NIITsement)

(All-Union State Scientific Research Institute of the Cement Industry)
Moskva, 1-i D'kovskii p. 4; tel. B6-03-31.

NAUCHNO-ISSLED. INSTITUT CHASOVOI PROM-STI (NIIChasprom)

(Scientific Research Institute of the Watch and Clock Industry)
Moskva, Golovanovskii p. 42a; tel. D7-32-93.

VSES. GOS. NAUCHNO-ISSLED. INSTITUT SHVEINOI PROM-STI (VNIIG-Shveiprom)

(All-Union State Scientific Research Institute of the Clothing Industry)
Moskva, Kostomarovskii p. 3; tel. K7-37-90.

TSENTR. NAUCHNO-ISSLED. INSTITUT SHELKOVOI PROM-STI (TsNIIShelka)

(Central Scientific Research Institute of the Silk Industry)
Moskva, Teplyi p. 11; tel. G5-10-15.

TSENTR. NAUCHNO-ISSLED. INSTITUT SHERSTYANOI PROM-STI (TsNIIShersti)

(Central Scientific Research Institute of the Wood Industry)
Moskva, M, Semenovskaya ul. 3; tel. E3-44-61.

NAUCHNO-ISSLED. INSTITUT SHINNOI PROM-STI (NIIShP)

(Scientific Research Institute of the Tyre Industry)
Moskva, 1-i pr. Sokolinoi gory 25; tel. Zh4-33-68.

INSTITUT EKONOMIKI

(Institute of Economics)
Moskva, Volkhonka 14; tel. K5-85-51.

TSENTR. NAUCHNO-ISSLED.INSTITUT EKONOMIKI I EKSPLUATATSII VODNOGO TRANSPORTA (TsNIIEVT)

(Central Scientific Research Institute for the Economics and Operation of Water Transport)
Moskva, Okruzhnoi pr. 14; tel. E5-36-59.

VSES. NAUCHNO-ISSLED. INSTITUT EKONOMIKI SEL'SKOGO KHOZHYAISTVA (VNIESKh)

(All-Union Scientific Research Institute for Agricultural economics)
Moskva, Orlikov p. 1/11; tel. K2-90-98.

NAUCHNO-ISSLED. INSTITUT EKONOMIKI STROITEL'STVA (NIIES)

(Scientific Research Institute for the Economics of Building)
Moskva,•Karetnyi ryad 5/10; tel. K4-11-47.

NAUCHNO-ISSLED. EKONOMICHESKII INSTITUT (NIEI Gosplana SSSR)

(Scientific Research Institute for Economics (of the State Planning Committee of the Council of Ministers of the USSR))
Moskva, 1-i Khoroshevskii pr. 3a; tel. D5-50-65.

TSENTR. NAUCHNO-ISSLED. EKONOMICHESKII INSTITUT GOSPLANA RSFSR (TsENII)

(Central Scientific Research Institute for Economics of the State Planning Committee of the Council of Ministers of the RSFSR)
Moskva, Smolenskii bul. 3/5; tel. G6-34-63.

NAUCHNO-ISSLED. INSTITUT EKSPERIMENTAL'NOGO PROEKTIROVANIYA

(Scientific Research Institute of Experimental Design)
Moskva, Dmitrovskoe shosse 9; tel. I6-28-19.

INSTITUT EKSPERIMENTAL'NOI BIOLOGII

(Institute of Experimental Biology)
Moskva, Baltiiskii pos. 13; tel. D7-17-21.

VSES. NAUCHNO-ISSLED. INSTITUT EKSPERIMENTAL'NOI ENDOKRINOLOGII (VIEE)

(All-Union Scientific Research Institute for Experimental endocrinology)
Moskva, Lavrov p. 6; tel. Zh1-20-43.

TSENTR. NAUCHNO-ISSLED. INSTITUT EKSPERTIZY TRUDOSPOSOBNOSTI I ORGANIZATSII TRUDA INVALIDOV (TsIETIN)

(Central Scientific Research Institute for Assessing the Ability to Work and for Organizing the Work of Invalids (i.e. for disability testing and rehabilitation))
Moskva, 2-i pr. Aeroporta 3; tel. D7-78-41.

VSES. NAUCHNO-ISSLED. INSTITUT ELEKTRIFIKATSII SEL'SKOGO KHOZYAISTVA (VIESKh)

(All-Union Scientific Research Institute for the Electrification of Farming).
st. Plyushchevo, M.-Ryazanskoi zh.d; tel. Zh2-02-81.

VSES. ORDENA LENINA ELEKTROTEKHNICHESKII INSTITUT im. LENINA (VEI)

("Lenin" All-Union Institute of Electrical Technology, Order of Lenin)
Moskva, Krasnokazarmennaya ul. 12; tel. Zh4-09-74.

VSES. NAUCHNO-ISSLED. INSTITUT ELEKTROENERGETIKI (VNIIE)

(All-Union Scientific Research Institute of Electrical Power)
Moskva, Bersenevskaya nab. 16; tel. komm. K0-10-40, dob. 37-18.

ENERGETICHESKII INSTITUT im. G. M. KRZHIZHANOVSKOGO (ENIN AN SSSR)

("G. M. Krzhizhanovskii" Institute of Power (of the AS USSR))
Moskva, Leninskii prosp. 19; tel. V2-33-84.

INSTITUT EPIDEMIOLOGII I MIKROBIOLOGII im. N. F. GAMALEYA (IEM AMN)

("N. F. Gamalei" Institute of Epidemiology and Microbiology (of the Academy of Medical Sciences))
Moskva, Shchukinskaya ul. 33; tel. D8-12-32.

MOSKOVSKII NAUCHNO-ISSLED. INSTITUT EPIDEMIOLOGII, MIKROBIOLOGII I GIGIENY (MNIEMG)

(Moscow Scientific Research Institute of Epidemiology, Microbiology and Hygiene)
Moskva, Uspenskii p. 12; tel. B3-40-10.

INSTITUT ETNOGRAFII im. N. N. MIKLUKHO-MAKLAYA

("N. N. Miklukho-Maklai" Institute of Ethnography)
Moskva, ul. Frunze 10; tel. B1-24-95.

VSES. INSTITUT YURIDICHESKIKH NAUK (VIYuN)

(All-Union Institute of Jurisprudence)
Moskva, Kropotkinskii p. 23; tel. G6-09-47.

INSTITUT YAZYKOZNANIYA

(Institute of Linguistics)
Moskva, Volkhonka 18/2; tel. G5-11-58.

Abbreviations used:

AS USSR	Academy of Sciences of the USSR
bul. (bul'var)	boulevard
der. (derevo)	village
dob. (dobavochnyi)	extension (telephone)
g. (gorod)	town, city
gos. (gosudarstvennyi)	state
inst.	institute
issled. (issledovatel'skii)	research
komm. (kommutator)	switchboard (telephone)
komn. (komnata)	room
korp. (korpus)	building
lab. (laboratoriya)	laboratory
Mosk. obl. (Moskovskaya oblast')	Moscow province
nab. (naberezhnaya)	embankment
p. (pereulok)	lane
pl. (ploshchad')	square
pochtovoe otd. (otdelenie)	postal district
pom. (pomeshchenie)	premises
pos. (posad)	settlement, suburb
pr., prosp. (prospekt)	avenue
prom-st' (promyshlennost')	industry
st. (stantsiya)	station
tsentr. (tsentral'nyi)	central
tup. (tupik)	cul-de-sac
ul. (ulitsa)	street
vses. (vsesoyuznyi)	all-union
zh. d. (zheleznaya doroga)	railway line

THE PROTECTION OF STEEL COMPONENTS AGAINST CORROSION BY MEANS OF INHIBITORS

O. A. Petrova and M. N. Nikol'skaya

*Byulleten' tekhniko-ekonomicheskoi informatsii, 1960 (9) 69-70

The investigation into the prevention of corrosion by means of inhibitors (restrainers) carried out by the TsNIIMashdetal' (Central Scientific Research Institute for Auxiliary Components and Spare Parts for Textile Machinery) had two aims: to search for inhibitors for sulphuric acid solutions in motion which cause corrosion of the carbon steels and cast iron in the equipment of the finishing departments of textile mills, and to test the inhibitors for several special steels with a view to protecting the latter against corrosion during temporary or long-term storage.

The selection of the corrosion inhibitors was complicated by the specific course of the corrosion process, occurring, as it does, in a moving solution the temperature of which varies between 50 and 80°C, and by the fact that no coloured substance could be introduced nor could the introduced substance be permitted to affect the quality and colour of the fabric and fibre.

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*LLU shelf mark: R00241. Holding: 1958 (1) -

The investigation was carried out in collaboration with the textile combine "Trekhgornaya Manufaktura im. Dzerzhinskogo" ("Dzerzhinskii" Three-Mountain Mill) where the inhibitors were tested on the different kinds of fabric as well as under production conditions in the indigosol dyeing plant.

The NIIKhIMP (Scientific Research Institute of the Chemical Industry) of the State Planning Commission of the RSFSR participated in the work of selecting and recommending the inhibitors.

There are no ready-made inhibitors, stable at temperatures up to 80°C, for 3 % solutions of sulphuric acid. None of the inhibitors used on an industrial scale (the "Unikol"*, KS, PB types and others) are stable at elevated temperatures. On the other hand, there are several inhibitors (prepared from inorganic compounds) which are more stable at elevated temperatures but have a colour and for that reason cannot be recommended.

The following inhibitors were investigated: "Manite"*, "Xelite"*, animal and vegetable albumins, and the OP-7 type inhibitor with thiourea; also starch, thymol, joiner's glue, tragacanth, "Zedu"* resin, oleaster gum and gelatine. The amount of metal dissolved per unit of surface of the metal specimen in a unit of time served as the criterion for the rate of corrosion. In the testing of the inhibitors on fabrics note was taken of the changes in the shade and in the mechanical properties of the fibre.

The tests at the mill established that inhibitors like the OP-7 type with thiourea affect the colour intensity even when employed in very small quantities and cannot be recommended for testing

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*manufacturers not known - Ed.

under production conditions. The tests with albumin and glue type inhibitors showed that they caused no change in the shade if used in low concentrations (0.5 - 3 g/l) whilst with concentrations in excess of 4 g/l the cloth changed its colour to an appreciable degree.

In the investigation of the effect of the above inhibitors on thw corrosion rate of carbon steel and cast iron in sulphuric acid solutions at temperatures between 20 and 80°C it became apparent that joiner's glue yielded the best results. The introduction of 0.5 - 3 g/l of joiner's glue into the so-called "development" vat (where, in a 3 % solution of sulphuric acid at a temperature of 80°C the cloth acquires its ultimate colour) does not result in a deterioration of the quality of the fabric and fibre.

When glue is introduced into the hot sulphuric acid solutions, the corrosion rate of carbon steel and cast iron is halved or better, and in solutions at room temperature it is reduced by a factor of 4 - 5.

The equipment for the acid dyeing method has a service life of one year. At the end of this period the dyeing vats are replaced. Every six months the subassemblies are given a general overhaul when joints are welded up and rollers (shafts) are replaced. In addition to the above, preventive maintenance work is carried out once every week or fortnight when roller journals, bearing housings, bolts, washers and nuts are replaced.

As a result of a check in production conditions, carried out at the "Trekhgornaya Manufaktura" Combine, it was found that when glue was introduced into the acid, the preventive maintenance work was being carried out once in eight weeks instead of once each week

or fortnight, and the replaced components were in a better condition than those which formerly were replaced after a week.

According to tentative calculations carried out in collaboration with the chief mechanic's department of the Combine, the savings in the running maintenance and general overhaul costs for a single plant unit amount to 7000 to 9000 rubles per annum. The calculations did not take into account idle time due to running repair and general overhaul work (which was reduced when glue was introduced), and no allowance was made in them for the fact that the consumption of chargeable components like nuts and bolts, and of a steel which is scarce, is replaced by the consumption of easily obtainable glue.

For protecting steel components while in temporary storage or in transit, volatile NDA (nitrite of dicyclohexylamine) type inhibitors were tried. These inhibitors are best for carbon steels subjected to atmospheric corrosion conditions.

An investigation was carried out of the 30KhGSA, 3, 20 and 35L types of carbon steel, the special steels EI481, EI415, EI268, EI437b, EI961, YalT, 18KhNVA, Kh17N2, 38KhMYuA, 2Kh13 and 40KhNMA, and of several types of non-ferrous metals and alloys (Vd-17, Bros 10/10).

The criterion for the corrosion rate is the condition of the surface of the components after the tests in the corrosion chamber. The test conditions specified: 100 % humidity, 8 h at 50°C and 16 h at 20°C; total testing time 51 days and nights.

The tests were performed on specimens which either were wrapped in paper impregnated with the above inhibitors or else had been coated with an inhibitor in aqueous solution.

Comparisons were made with specimens which had been protected with an oil film and waxed paper as well as with specimens which had not been given a coating of oil (for components which must remain free of oil films).

The VNIINeftekhim (All-Union Scientific Research Institute for Petroleum Chemistry) of the State Committee for Chemistry of the Council of Ministers of the USSR participated in the investigation.

On the basis of tests on specimens of different preservation methods it was established that nitrite of dicyclohexylamine (NDA) is the best of the known inhibitors of atmospheric corrosion for the special steels enumerated above. NDA is not suitable as an inhibitor for non-ferrous metals and aluminium - magnesium alloys. NDA-impregnated paper protects the steel very much more efficiently than a simple wrapping of waxed paper even if, in the latter case, the surface of the component has been greased.

When applied to the wrapping paper to the amount of 15 - 18 g/m^2, the NDA inhibitor protects steel against corrosion over ten times more efficiently than when applied in aqueous solution directly to the surface. Both, corrosion-resistant as well as other steels, are equally effectively protected against corrosion by NDA-impregnated paper.

REPORTS ON VISITS

The following published reports on visits have been received in the D.S.I.R. Lending Library Unit, 20, Chester Terrace, London, N.W.1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the Lending Library Unit.

VETERINARY SCIENCE

CALLIS, J.J. et.al.: "Veterinary Science in the Soviet Union - Report of a Technical Study Group". Agricultural Research Service, US Department of Agriculture, Washington, October 1959.

(Report on visit by 6-man team from 24th July to 26th August 1958. Institutions visited included in Moscow: the "Lenin" All-Union Academy of Agricultural Sciences, the Ministry of Agriculture, the All-Union Agricultural and Industrial Exhibition, the All-Union Institute of Experimental Veterinary Medicine (VIEV), the Moscow Veterinary Academy the All-Union Scientific Research Institute of Veterinary Sanitation and Ectoparasitology; in Kursk: a biocombine; in Kharkov: the Ukrainian Institute of Experimental Veterinary Science, the Kharkov Zootechnical Institute, the Kharkov Research Institute of Animal Husbandry of Forest, Steppe and Woodland Regions of the Ukrainian SSR;

in the Bogodukhovskii rayon near Kharkov: a regional veterinary diagnostic laboratory, a regional veterinary hospital, the "Rodina" collective farm; in Tbilisi: the Georgian Research Institute of Animal Husbandry and Veterinary Science, a state farm, the Georgian Zoo-veterinary Institute, another state farm; two state farms in Gagry; in Alma-Ata: the Kazakh Veterinary Research Institute, the Alma-Ata Zooveterinary Institute, the Alma-Ata Biocombine, the Institute of Zoology of the Kazakh Academy of Sciences, a meat combine; in Frunze: the Kirgizian Republic Station for Pure Breeding Cattle (an artificial insemination centre), the Kirgizian Republic Veterinary Laboratory, a state farm; in Leningrad: the Leningrad Veterinary Institute, the "Sunrise of Communism" collective farm near the Finnish border. The report covers organization, training and research and includes lists of research workers in the various institutes visited.)
LLU shelf mark: V 82

AGRICULTURE

BUTLER, K. D., et. al.: "Farm Mechanization in the Soviet Union - Report of a Technical Study Group". Agricultural Research Service, US Department of Agriculture, Washington, November 1959.
(Report on 30-day visit by 6-man team from 20th August 1958. Places visited include Moscow, Minsk, Kiev, Zaporozhe, Kharkov, Rostov-on-Don, Krasnodar, Barnaul and Shipunovo. Research and Educational establishments visited include: the Research Institute

of Farm Mechanization, the Institute of Farm Mechanization and Electrification, and the Institute of Technology and Repair in Moscow, the Belorussian Institute of Mechanization and Electrification of Agriculture in Minsk, the Ukraine National Research Institute for Farm Mechanization and Electrification in Kiev, the All-Union Research Institute of Farm Electrification in Zaporozhe, the All-Russia Institute for Farm Mechanization in Rostov-on-Don, the Kuban Research Institute for Tractor and Machine Testing in Krasnodar, the Milk State Farm School in Altai near Barnaul, the Institute of Constructors Bureau for Farm Machine Testing of the Gosplan in Moscow and the University of Moscow.)

LLU shelf mark: V 83

KELLOG, C.E., et al.: "Soil and Water Use in the Soviet Union - Report of a Technical Study Group". Soil Conservation Service, US Department of Agriculture, Washington, June 1959.

(Report on visit by 7-man team from 18th July to 20th August 1958. Institutions visited included in Moscow: the Ministry of Agriculture, the All-Union Agricultural Exhibition, the "Lenin" Academy of Agricultural Sciences, the "Dokuchaev" Institute of Soil Science, the "Timiryazev" Agricultural Academy, Moscow State University, and the All-Union Institute of Fertilizers and Agro-Chemistry; in Minsk: the Belorussian Scientific Research Institute of Amelioration and Water Utilization, the Minsk Experimental Station, the Volma Lands Reclamation Project, the

"Komintern" collective farm, the "New Life" collective farm; in Kiev: the "October" collective farm, the Ukrainian Agricultural and Industrial Exhibition; in Poltava: "Stalin" collective farm, the Poltava Provincial Agricultural Experimental Station; the "Ordzhonikidze" collective farm in the Dnepropetrovsk region; the "Dneprovskii" state farm in the Zaporozhe region; the All-Union Scientific Research Institute for Maize; in the Rostov region: the "Koisug" state farm, the "Red Orchard" state farm, the "Lenin" collective farm; in the Krasnodar region: the Kuban Rice Experimental Station, the Krasnoarmeisk state farm, the "Michurin" collective farm; in and near Stalingrad: afforestation areas, the Stalingrad Agricultural Institute, the All-Union Scientific Research Institute of Agro-Forest Amelioration, the "40th Anniversary of the October Revolution" collective farm; in Tashkent: the Middle Asia State Project, the Institute of Water Economy and Cotton, the "Akhun Babaev" collective farm, the Middle Asian Institute of Mechanization and Electrification of Irrigated Agriculture (Yangi-Yul), the Akhavak Central Agro-Technical Station, the Experimental Station of the Middle Asian Scientific Research Institute of Plant Breeding of the USSR; in and near Andizhan: the Bolshoi Fergana Canal, the Savay State Farm, the "Sverdlov" collective Farm; in the Akhmolinsk region: the "18th Anniversary of the Kazakh Republic" collective farm, the Kazakh Scientific Research Institute of Grain-Crop Growing (Shortandy), the Shortandsinski state farm.)
LLU shelf mark: V 84

KELLOG, C.E.: "A Visit to the Soviet Union", Soil Conservation, January 1959, pp.123-130.

(Abridged version of report noted above (V 84).)

LLU shelf mark: V 85

RODENHISER, H.A., et al.: "Crops Research in the Soviet Union - Report of a Technical Study Group". Agricultural Research Service, US Department of Agriculture, Washington, August 1959.

(Report on visit by 5-man team from 15th July to 17th August 1958. Institutions visited included in Moscow: the Agricultural and Industrial Exposition, the All-Union "Lenin" Academy of Agricultural Sciences, the Institute of Genetics (Lysenko), the Gorki Leninskie Experiment Station, the All-Union Institute of Grain Production and Processing and the "Timiryazev" Agricultural Academy; in Kiev: the Ukrainian Academy of Agricultural Sciences, the collective farm "Rodina", the All-Union Sugar Beet Institute, the All-Union Mironovskaya Experiment Station; in Dnepropetrovsk: the Sinelnekova Experiment Station, the All-Union Institute of Maize Research, the collective farm "Lenin"; in Krasnodar: the Krasnodar Research Institute of Agriculture, the All-Union Institute of Oil-Bearing Crops, the collective farm "Kirov" and another collective farm, the Northern Caucasian Institute of Horticultural Crops and Grape Growing, the All-Union Institute of Tobacco; the collective farm "Stalin" on the road to Pyatigorsk; the collective farm "Proletarskaya Volya" and a botanical garden in Pyatigorsk; the Research

Institute of Agriculture for the Southeastern Area in Saratov; in Ershovsk: the state farm "Dekabrist" and the collective farm "18 Parts'ezd"; in Tashkent: the Uzbek Academy of Agricultural Sciences, the "Shreder" Research Institute of Horticulture and Grape Growing, the Institute of Cotton Genetics, the Ak-Kavakskaya Experiment Station, the collective farm "Sverdlov", the All-Union Institute of Plant Chemistry; in Alma-Ata: the Kazakh Academy of Agricultural Sciences, the collective farm "Gornyi Gigant", the Alma-Ata Plant Breeding Station; in Omsk: the Siberian Research Institute of Agriculture, the State Cattle Breeding Farm, glass-house farms, the collective farm "Chapaev"; in Leningrad: the All-Union Institute of Plant Industry, the "Komorov" Institute of Botany, the All-Union Institute of Plant Protection.)
LLU shelf mark: V 86

BARBER, C. H., et al.: "Cotton Growing in the Soviet Union - Report of a Technical Study Group". Foreign Agricultural Service, US Department of Agriculture, Washington, June 1959.
(Report on a 32-day visit by 6-man team from 7th Septembe 1958. Places visited included Moscow, Baku, Kirovabad, Ashkhabad, Stalinabad, Kurgan-Tyube, Tashkent, Samarkand, Bukhara, Andizhan, Fergana and Leningrad where the Plant Breeding Research Institute and the Plant Protection Institute were visited. Names of other institutions and plantations are not given, overall, rather than specific, impressions being reported. Exports,

imports, cotton yarn production, acreage of cotton and cotton ginnings statistics are appended.)

LLU shelf mark: V 87

INDUSTRIAL MANAGEMENT

PEDERSEN, P. T.: "Factory Management in the Soviet Union", The Times Review of Industry, October 1960, p. 97.

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EFFECT OF INCREASED GAS PRESSURE ON THE CHEMICAL COMPOSITION OF PIG IRON

In analysing the influence of gas pressure in the furnace on the chemical composition of pig iron the fact that the blast-furnace process is not isothermal must be allowed for. A full report is published in Stal in English, 1960 (10).

MISCELLANEOUS TRANSLATIONS AND SURVEYS

A short glossary of Russian metallurgical and heat treatment terms not usually found in dictionaries is published in Stal in English, 1960 (9) 704.

"Production Statistics of Communist China" by G. W. Hemy is an unpublished report produced in London in January 1956. In Section A (Fuel and Power, Mining, and Heavy Industry) figures are given for (1) Electricity, (2) Coal, (3) Coke, (4) Pig Iron, (5) Crude Steel, (6) Finished Steel, (7) Other Metallic Minerals, (8) Crude Oil, (9) Petrol, (10) Tyres, (11) Cement, (12) Electrical Machinery, (13) Machine Tools, (14) Vehicles, (15) Chemicals. In section B (Light Industry) figures are given for (1) Cotton Textiles, (2) Other Textiles, (3) Rubber Footwear, (4) Flour, (5) Sugar, (6) Vegetable Oil, (7) Cigarettes, (8) Matches, (9) Paper, and (10) Miscellaneous Products. Section C (Agriculture) contains tables on (1) Food Crops, (2) Grains, (3) Oilseeds, (4) Sugar, (5) Cotton, (6) Tobacco, (7) Other Crops, and (8) Yields. Section D includes statistics of (1) Population and Labour Force, (2) Value of Production, (3) Exports and (4) Communications.

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RTS 1693. Edible honeysuckle (Lonicera edulis L.)
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RYABOVA, P. I.
RTS 1680. On the distribution of rubus saxatilis L.
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URUSOV, I. D. & PODREZ, V. M.
RTS 1609. Model tests for determining the rigidity and vibration resistance of electrical stator frames.
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DOKLADY AKADEMII NAUK SSSR (Reports of the Academy of Sciences of the USSR)

DERYAGIN, B. V. & DUKHIN, S. S.
RTS 1742. Motion of aerosol particles in a diffusion field.
1956 106 (5) 851-854 10s.

IZVESTIYA AKADEMII NAUK ESTONSKOI SSR: SERIYA BIOLOGICHESKAYA (Bulletin of the Academy of Sciences of the Estonian SSR: Biological Series)

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RTS 1736. Determination of the flow capacity of a plane turbine blade system.

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PANKOVA, I. A.

RTS 1675. Herbaceous plants with Vitamin-C content.

1949 Ser. 5 (2) pp. 292-294, 303-325, 470-478 80s.

TRUDY INSTITUTA FIZIOLOGII IMENI I. P. PAVLOVA (Transactions of the Institute of Physiology of I. P. Pavlov)

KOKORINA, E. P.

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RTS 1642. Physical aspects of explosion-proof electric equipment in mines.
1959 9 (2) 3-28 65s.

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KHRZHANOVSKII, V. G. & LAZEBNAYA, A. M.
RTS 1695. Vitaminous dog-rose of the Carpathian area as a natural raw material for the vitamin industry.
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UKRAINSKII KHIMICHESKII ZHURNAL (Ukrainian Chemical Journal)

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1956 22 (6) 705-712 20s.

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KUKHARENKO, A. A.
RTS 1662. The Paleozoic complex of ultrabasic and alkali rocks in the Kola peninsula, and the related deposits of the rarer metals.
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ZHURNAL NEORGANICHESKOI KHIMII (Journal of Inorganic Chemistry)

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FORESTS AND FOREST INDUSTRY OF THE CHINESE PEOPLE'S REPUBLIC

Anon.

*Informatsionnyi sbornik tekhniko-ekonomicheskikh pokazatelei (TsBTI les. prom.) 1960 (1(8)) 69-72.

China's forest area is the fourth largest in the world (after the USSR, Canada, and the USA).

In 1949 the area covered by forest was about 7% of the whole area of the country. Popular organizations began to organize the rational utilization of the forest wealth of the new China, including the felling and raising of forests.

Increasing the forest area of the country became one of the priority tasks of People's China.

In the next thirty years, forests are to be raised on unforested hills and waste land, which now amount to some 270 000 000 ha. New forest stands are appearing around villages, and along the banks of big and small rivers. In the north-west and central parts of the country large shelterbelts will be created. All this will increase the forest area to 20%.

In spring and autumn 1958, forests were planted on 17 300 000 ha, which is four times the area planted in 1957.

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Great attention is paid to forest regeneration on felled areas by means of artificial sowing and planting.

At the present time, the forest area is 10.1%, and the standing volume of wood is about $6 \cdot 5 \times 10^9$ m^3. Increment exceeds the volume felled. The total forest area of the Chinese People's Republic is about 97 200 000 ha, of which about 70 million ha actually carry forest.

The timber increment per ha of forest area in China is greater than in Canada, the USA, France and many other countries. In Table I is shown the distribution of forests in China, by regions.

Table I

Distribution of standing volume by regions in the Chinese People's Republic

Regions and Provinces	Area covered by forest, in thousand* ha	Volume of timber, in million m^3	% forest cover
Northern China (3 provinces)	1119	40+	14.9
Inner Mongolia (Autonomous region)	9935	1100	14.9
N. E. China (6 provinces)	16576	2320	18.7
N. W. China (4 provinces)	4200	292	4.3
Sinkiang-Uighur (Autonomous region)	2950	188	1.9
E. China (6 provinces)	7450	695	6.7
Central-southern China (6 provinces)	8350	545	7.5
S. W. China (5 provinces)	19400	1360	7.8
TOTAL	69980	6540	10.1

* "million" in original - Ed.
\+ "400" in original -Ed.

China's forests are found in various climatic zones - cold, temperate, subtropical, and tropical. Accordingly, the composition of the stands varies.

China's forests contain over 5000 tree species. The number of species of trees and arborescent shrubs is about $2\frac{1}{2}$ times that in North America. There are represented the species growing in the northern forests - spruce, fir and Siberian pine; those in the central broadleaved areas; the trees of the tropical forests - cunninghamia, chestnut, plane, teak, camphor, ebony, bamboos reaching heights of 20 m.Cunninghamia (Japanese fir) has the technological properties of fir and is widely distributed, thanks to its rapid growth which is not inferior to that of the poplar.

In the tropical zone there also grow rare "technological" trees such as the lac tree, Myrica cerifera, tung, Cinchona officinalis, rubber, mulberry, and Sapium sebiferum. In the forests of the north and north-east, the dominant species is larch.

In the mixed coniferous-broadleaved forests of China there grow other woody species of industrial importance - Ulmus pumila var. arborea, common elm, lime, aspen, poplar, alder, acacia, apple, cherry, rowan, hazel, and pear.

Coniferous species are the most important in Chinese forests, occupying over half of the forest massifs. Coniferous species also form about 60% of the fellings.

Now the needs of the national economy of the Chinese People's Republic for forest products are satisfied from her own forest resources. In the period of the Kuomintang regime, timber imports amounted approximately to 33 000 000 Kuomintang silver dollars.

The main forested regions of China are the north-east (forest cover 18.7%), Inner Mongolia (14.9%), north-west (4.3%); south-west (7.8%), and east (6.7%). Here, state industrial forest enterprises have been set up.

The main supplier of wood for the national economy at the present is north-east China. Here are concentrated the main raw materials of the country, based on which the logging and sawmilling industries are developing.

The main centres of forest industry in north-east China are Antung, Kirin, Ichun, Harbin and Dalnii. To satisfy the demands of timber and raw materials for the paper industry, wood is exported from north-east China to the interior regions of the country.

North-east China and the autonomous region of Inner Mongolia together possess over 50% of all the standing volume of timber in the country. This amounts to more than Finland and France together. In Inner Mongolia alone, the forest cover some 10 000 000 ha. There are particularly rich forest massifs in the mountain regions of the Big and Little Hingan mountains, the Changpai Shan, and the Wan Ta Shan.

Felling is done mainly in a strip of 20-30 km on both sides of the railways, and along rivers (where timber floating can be done) intersected by the railways.

In the southern spur of the Little Hingan mountains there are mixed hardwood-coniferous forests. This is splendid building timber. Daily, hundreds of wagons are sent from here to all parts of the country, loaded with shipbuilding timber, sawtimber, sleepers, telegraph poles, scaffolding timber and other building materials necessary for the numerous new buildings of the New China.

At the foot of the Little Hingan mountains in the region of the Ichun fellings, forest stations have been set up, in each of which there are hundreds of workers. They fell timber, destroy weeds, till the soil, clean up felled and cleared plots of forest for growing seeds, protect mature trees and young growth, and take steps for rapid natural regeneration of the forests.

25% of the wood felled in north-east China is used in the region. Here and in other regions (Mutankiang, Tunghwa, Yenpien and Tunghung) narrow-gauge railways and small rivers are used to get the wood to timberyards, whence it is transported by rail and by navigable rivers.

Gradually the heavy work in floating timber is being mechanized, especially in getting timber out of the water.

In the forests of Inner Mongolia and north-east China new railways and roads have been built and are being built. In the forest regions of north-east China some tens of sawmills fitted with modern equipment have been built. The biggest automated mill is at the main timber transport point in Kiamusze.

Timber conversion on the spot means economics in transport costs. The majority of pulp and paper undertakings are situated in the logging centres east of Kirin. In the town of Kiamusze, the centre of the forest industry of Heilungkiang province, the building of a big combine is being completed, which will produce technical grades of paper.

There are big massifs of coniferous forests in the high mountain regions of the provinces of Szechwan, Kansu and Chinghai, and also in Tibet. In the forests, fir, spruce, tsuga and Chinese larch are widely distributed. The timber volumes of this region are inferior

only to those in the north-east of the country. They are the second most important logging area of China.

In the high mountain areas of south-west China, logging work is based mainly on hand labour.

Under mountain conditions, output per worker is insufficient; at the moment it does not exceed 70-80 m^3 per annum. In narrow valleys and ravines, where the mountain rivers flow, flumes or floating channels are being built. The walls and bottom of the channels are made of stone and partly (on the surfaces) of 50-60 mm boards. The channels are 1 x 1 m in cross-section. They can pass up to 600 m^3 of timber per shift, and are up to 7 km long. To fill the channels with water, dams are built. Timber chutes are connected to these channels.

In 1959 the Academy of Forest Sciences of the Chinese People's Republic sent an expedition to study logging technology and the organization of new rational methods of logging. This was only the start of research in forest industry in China. The Academy of Forest Sciences and the Research Institute for Forest Industry in Peking, and also the Forest Technology Academy in Harbin undertook the study of the most effective means of logging mechanization in difficult mountain conditions, and also the problem of timber transport and skidding with cable devices and various timber chuts.

In the forest regions of south-west and south China, paved roads for timber transport will be built in the immediate future. Now, cableways are being constructed, and the riverbeds are being prepared for floating timber.

Much work is being done on the utilization of the forest massifs in south-west China around the Tatu Ho, Nanpan Kiang, Kinsha Kiang

and Yalung Kiang rivers, where there are extremely rich virgin forests, the timber stocks of which are inferior only to the forests of the Big and Little Hingan mountains. Scarcely any fellings have yet been done in these forests.

Besides forest tree species, bamboo is widely distributed in south China. There are about 180 different species of it here Bamboo is widely used in the national economy of China. From the bamboo culms are built houses, bridges, water pipes, masts, furniture (tables, chairs), various agricultural implements, and sundry small articles (baskets, blinds, mats, and other household articles), musical instruments (flutes, pipes, clarinets). Young bamboo shoots, rich in nutrients, are used in food. Bamboo is also used in paper manufacture.

The forest industry of People's China is developing together with the growth of the whole national economy.

Timber produced in China increases in volume every year - 5 900 000 m^3 in 1950, and over 30 000 000 m^3 in 1959. Paper and cardboard production is developing rapidly. Sawmilling increased in the last three years from 3.65 to 7.24 million m^3 (in 1959).

Early in 1956, China reorganized the administration of forestry and forest industry - a Ministry of Forestry and a Ministry of Forest Industry were organized.

It transpired that separate management of forestry and forest industry was unsuitable, and at the end of 1957 a single Ministry of Forestry was created, the function of which is to manage both forestry and forest industry.

As a result of this unification, joint forest enterprises were created, carrying out correct forest exploitation which ensures

timber for the national economy, and continuous regeneration to improve and increase the forest resources of the country.

In the north-eastern provinces, hundreds of kilometres of railways for timber transport have been made.

A considerable amount of modern equipment is going into forest - skidding tractors, lorries, cranes, mechanical winches; the level of mechanization of timber logging and extraction is being raised.

In the north-east of the country, including Inner Mongolia, operations carried out with the aid of machinery rose from 17 to 42% in the period 1952-1957. Petrol-driven power saws have started to be used.

In the forest regions, many well equipped units have been set up where mensuration, rational logging methods, and measures for correct timber utilization have been introduced. Logging technology is being constantly improved. For example, in felling trees, stumps 10-20 cm high are left now (instead of 70-100 cm earlier). This along provided a large extra amount of timber for the state.

Technical innovations have enabled the seasonal nature of logging to be considerably reduced. In many regions timber is being logged all the year round.

The woodworking and forest chemicals industries have developed greatly in China. In 1958, output of sawn timber was 265% compared to 1953. Plywood production is also growing fast. In 1957 it had increased by 97.14% compared with 1953. The gross production of the forest chemicals industry in 1957 was 11.5 times greater than that of the best year before the freeing of the country.

In the town of Yakoshih in the Hailar region of Inner Mongolia, the biggest forest combine in China is being rapidly built.

It combines forest chemicals and woodworking factories. This enterprise will convert 150 000 m^3 of sawtimber per year.

Everywhere in China the manufacture of standard finished wooden parts and pieces is getting under way. These are necessary for building dwellings, etc. In the Harbin wood-shaping factory, all the main processes for the production of standard parts are already mechanized.

The forest industry of China is contributing its share in the industrial transformation of the country.

*GOVERNMENT ORGANS OF THE USSR WHICH EXERCISE CONTROL OVER SCIENTIFIC ESTABLISHMENTS

G. I. Fed'kin

According to the 1936 Constitution of the USSR, questions of the organization of scientific research that are common to the whole of the USSR are decided by Verkhovnyi Sovet SSSR (the Supreme Soviet of the USSR) and its Presidium, by Sovet Ministrov SSSR (the Council of Ministers of the USSR) and its committees and commissions, by ministries, and by other governmental organs.

The Supreme Soviet of the USSR, being the highest organ of the governmental power of the Soviet Union, exercises, in the control of scientific establishments, all the rights assigned to the Union of Soviet Socialist Republics, insofar as they do not by the Constitution come within the competence of organs that are accountable to the Supreme Soviet: the Presidium of the Supreme Soviet of the USSR, the Council of Ministers of the USSR and the ministries of the USSR. In this respect the sphere of competence of the Supreme Soviet does not differ at all from its competence in any other field of governmental control.

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*Extract from book: Fedkin, G. I: "Pravovye voprosy organizatsii nauchnoi raboty v SSSR." (Legal questions concerning the organization of scientific work in the USSR). Gosyurizdat, Moscow, 1958. pp. 317-326.

The Supreme Soviet has considered questions of the development of science in connection with general measures for the development of the national economy and culture, and with measures for improving the organization of governmental control in the country. This happened, for instance, at the 7th session of its 4th meeting in 1957, in dealing with the question of further improvement in the organization of the control of industry and construction, which was raised by the Central Committee of the CPSU and the Council of Ministers.

These questions were examined and decided during the discussion of plans for the development of the national economy of the USSR.

Such questions are examined and decided by the Supreme Soviet at the annual discussion of the budget for the USSR and the budget accounts, and also during the examination of government proposals for the creation of new organs of public administration or the reorganization of existing ones: ministries, committees and so on.

When discussing these questions deputies of the Supreme Soviet frequently make pointed references to particular ministries and departments which have permitted serious deficiencies in the control of scientific establishments, criticize particular establishments which have done their allotted tasks badly, and introduce proposals for changes in current legislation on scientists and the organization of research in this country*.

Comments and proposals of this nature are, if the Supreme Soviet so decided, transmitted for examination to the government of the USSR, which takes note of them in preparing appropriate proposals for the Supreme Soviet, or in its practical executive and administrative functions.

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*See for instance the intervention of deputies Ambartsumyan and Babaèv at the 2nd session of the 4th meeting of the Supreme Soviet, shorthand transcript pp. 309-311 and 90. .

The Presidium of the Supreme Soviet in the period 1938-1956 issued comparatively few documents referring specifically to the organization of science in this country. Its orders on these questions referred mainly to:

(a) Initiating the encouragement of scientists by awards of orders and medals, by the creation of the title of Stalin Prizewinner and so on, and

(b) Organization of new and reorganization of existing organs of governmental control, which are entrusted to a greater or lesser degree with the control of scientific work (creation of Committees and Commissions of the Council of Ministers and reorganization of ministries).

The Presidium has not issued any documents defining the legal position of scientific establishments and scientists. Questions of this kind and other matters concerning the control of the development of science are decided by the government of the USSR.

The Council of Ministers of the USSR exercises control over the activities of all the scientific establishments of the state.

This control is exercised directly by the Council with regard to certain scientific establishments (Akademiya nauk SSSR (Academy of Sciences USSR)). With regard to others (research institutes and higher educational establishments of ministries and departments of the USSR) it is done through the appropriate ministries and departments; and with regard to a third category (scientific establishments of Union republics) through the Councils of Ministers of the Union republics.

In what does the control of the Council of Ministers of the USSR over the activity of scientific establishments consist, and how does

it manifest itself at the present time ?

The Council of Ministers of the USSR within the rights accorded to it by the Constitution of the USSR:

(a) Unifies and directs the work of Unions and Union-Republican ministries of the USSR, and other establishments within its jurisdiction, in the control of scientific establishments that are subordinate to them; if necessary it forms special committees and directorates of the Council, and gives them tasks in the sphere of the control of scientific establishments.

(b) It initiates research to insure fulfilment of the plan for the national economy. It controls the planning of research on the national scale and its financing in accordance with allotments in the state budget.

(c) It controls directly the activity of scientific establishments of the Council (the Academy of Sciences USSR).

In exercising general control over the activities of the scientific establishments of the country, the Council, on the basis and in the execution of current laws, issues decrees and ordinances and verifies their execution.

Decrees and ordinances of the Council of Ministers of the USSR are issued:

(a) On general questions of the development of science and the practical application of the achievements of science, including questions of the legal position of scientists, discipline and salaries of scientists, the law of authorship and invention, the training of staff, and other questions concerning the legal position of scientists in the USSR.

(b) On the development of particular branches of science (agricultural science, educational science and so on).

(c) On the improvement of the work of particular scientific establishments and the organization of new scientific establishments, including also the legal position of these establishments (for instance, approval of their statutes).

(d) On questions connected with the activity of particular outstanding scientists (creation of the conditions they need for their scientific work, organization of work on their legacy to science, perpetuating their memories and so on).

On questions of the development of science that are of great national importance, the Council of Ministers of the USSR issues decrees in conjunction with the Central Committee of the CPSU (for instance the decree of the Central Committee and the Council of Ministers of 14th February 1956 "O merakh po uluchsheniyu raboty n.-i. uchrezhdenii po sel'skomu khozyaistvu"(On Measures for Improving the Work of Research Establishments on Agriculture)).

Decrees and instructions of the Council of Ministers of the USSR are, of their juridical nature, in some cases concrete instructions bases on laws (acts of application of the law). In other cases they establish general standards and belong to the category of documents which in Soviet juridical literature are known as sources of law (istochnik prava).

It would be senseless to try mechanically to divide all governmental acts into acts establishing standards and acts of application of the law. But it would be wrong to refuse on these grounds to make an analysis to distinguish (1) the general standards established by the government of the USSR on the questions that interest us from (2) the concrete instructions which apply only to a given case and do not possess the property of general standards.

The following may be quoted as examples of decrees of the Council of Ministers of the USSR that establish general standards:

(a) Resolutions concerning the governmental committees of the Council of Ministers and of the ministries of the USSR, which define the extent of the competence of these organs in the control of scientific establishments.

(b) The statute of the Academy of Sciences USSR and statutes of the branch academies (VASKhNIL (the "Lenin" All-Union Academy of Agricultural Sciences) and AMN SSSR (the Academy of Medical Sciences of the USSR)) and decrees amending these statutes.

(c) Decrees on salaries and pensions of scientists, and on the law of authorship and invention.

(d) Decrees on scientific grades and titles and the procedure for awarding them.

(e) Resolutions on admission of students at higher educational establishments and research establishments.

An example of a resolution of the Government of the USSR which of its juridical nature is an act of application of the law may be found in the resolution of SNK SSSR (Council of People's Commissars of the USSR*) of 10th October 1939 "On the Legacy to Science of Professor N. E. Zhukovskii", in which the Government of the USSR noted the exceptional importance of his scientific works, recognized them as government property, and entrusted the preservation, development and publication of the legacy to science of Professor Zhukovskii to TsAGI (The Central Aero-Hydrodynamic Institute). (Sobranie zakonov SSSR, 1939 (54) 502)

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*now the Council of Ministers of the USSR

The foregoing shows what a wide range of questions concerning the control of scientific establishments is considered and decided directly by the government of the USSR.

The preparation and introduction of the relevant proposals to the government is carried out mainly, but not exclusively, by the governmental committees and commissions of the Council of Ministers USSR, by ministries and departments of the USSR, and by the councils of ministers of the union republics.

Some important questions on the organization of scientific work in the USSR are referred to the government by social organizations: the Central Committee of the Communist Party of the Soviet Union, the Trades Unions, scientific establishments (primarily the Academy of Sciences USSR), and also by individual scientists.

The government of the USSR has granted very wide powers of control over particular aspects of the activities of scientific establishments to governmental committees and commissions of the Council of Ministers of the USSR, and also to certain ministries and departments of the USSR.

Until 1957 it was accepted practice that almost every ministry and department of the USSR had "its own" scientific establishments: research institutes, laboratories and the like.

Control by ministries and departments embraced all the principal aspects of the work of a scientific establishment and often hampered the initiative of the establishments themselves, their directors, their scientific councils, and their scientific staffs as a whole.

The ministries and departments, in accordance with their statutes, prepared plans for research and experimental work and plans for the application of advanced technology, exercised control over research, invention and the application of the achievements

of advanced science and technology in industry.

While exercising control over such a complex "household", ministries and departments depend upon it for all the principal work involved in industrial advance, in technical progress and in improving the organization of industry.

By a decree of the 4th May 1955 the Council of Ministers of the USSR gave ministries of the USSR the right to create, reorganize and liquidate research institutes, subject to the agreement of the Minister of Finance in each case.

The juridical form of manifestation of control over the activities of scientific establishments by ministries can be seen in the orders and instructions of the ministries, issued under article 73 of the Constitution of the USSR, within the limits of the competence of the ministries concerned, on the basis and in the execution of current laws, and of the resolutions and instructions of the Council of Ministers of the USSR.

The orders and instructions of ministers on questions of the organization and activity of scientific establishments are in the main concrete instructions which are intended to give effect to the laws and resolutions of the government.

But there are some of them which establish new standards of law. Examples are those which:

(a) Approve model statutes for scientific establishments under the jurisdiction of the ministries concerned (or model resolutions about such statutes).

(b) Establish procedure for the preparation and approval of plans for research at the establishments.

(c) Define procedure for inspection of research on completion.

When the control of industry and construction was reorganized, the majority of scientific establishments of the ministries and departments that were liquidated were transferred to the jurisdiction of the Councils of Ministers of Union republics.

But the reorganization of the control of industry and construction on the territorial principle by no means implied or implies that Union ministries and departments are removed from the control of the organization of scientific work.

These functions were retained in their entirety by the non-industrial ministries. They are also exercised by the Union industrial ministries which have been preserved with changed functions, and by committees of the Council of Ministers of the USSR (Gosstroi SSSR (State Construction Board of the USSR), the Scientific and Technical Committee, Gosplan SSSR (State Planning Board of the USSR) and others), in respect of the leading "head" research establishments under their jurisdiction.

Control of scientific establishments was and is exercised not only by ministries and departments which have scientific establishments under their jurisdiction. Certain other ministries also exercise these functions: the Ministry of Finance of the USSR, the Ministry of Higher Education of the USSR, and the Committee of the Council of Ministers of the USSR.

With the adoption of the Law "On the Further Improvement in the Organization of the Control of Industry and Construction", the part played by Gosplan SSSR in the control of scientific work became much greater.

The increase consists firstly in the fact that the most important measures in the development of science and technology must be

provided for by a single plan for the development of the national economy established by Gosplan USSR, and secondly in the fact that a number of the chief research institutes in industry are under the jurisdiction of appropriate sections of Gosplan.*

Functions that are of national importance and have great significance for the development of science were entrusted to the Scientific and Technical Committee of the Council of Ministers of the USSR, which was formed in accordance with the same law.

The scientific world reacted favourably to the idea of the formation of an organ of the kind proposed in papers by N.S. Khrushchev.+ In speeches on these papers by a large number of Soviet scientists, concrete suggestions were made on the role of this organ in the control of scientific establishments, the principles for the recruitment of members, the forms of work, the extent of its rights and other questions.**

*See Khrushchev, N.S.: "O dal'neishem sovershenstvovanii organizatsii upravleniya promyshlennostyu i stroitel'strom" (Further Improvement in the Organization of the Control of Industry and Construction). Report to seventh session of the Supreme Soviet USSR. Gospolitizdat, 1957, p. 42.

+ In these papers the name suggested for the organ was "engineering and technical committee".

** See: Lavrent'ev, M., and Khristianovich, S.: "Vazhnoe slovie razvitiya nauki" (An Important Condition for theDevelopment of Science), Pravda, 2nd August 1957; Kapitsa, P.L.: "Nekotorye voprosy organizatsii nauchnoi raboty" (Some problems in the Organization of Scientific work), Pravda, 4th May 1957; Sedov, L.: "Glavnoe-kadry" (The Main Thing is Staff), Literaturnaya Gazeta, 13th April 1957; Sorina, Ya.: "Protiv nedootsenki nauchno-tekhnicheskikh obshchestv" (Against Undervaluation of the Scientific and Technical Societies), Promyshlenno-ekonomicheskaya gazeta, 14th April 1957; Ratenburg: "O funktsiyakh Inzhenernogo komiteta" (Functions of the Engineering Committee), Promyshlenno-ekonomicheskaya gazeta, 5th May 1957; Topchiev, A., and Kirillin, V.: "O planirovanii i koordinatsii nauchnykh issledovanii" (Planning and Coordination of Scientific Research), Pravda, 7th May 1957.

The law "On Further Improvement in the Organization of the Control of Industry and Construction", which was passed by the Supreme Council of the USSR in its 7th session on 10th May 1957, reflected the basic ideas in the papers by Comrade N. S. Khrushchev concerning the organization of control by the whole government of scientific work for the needs of industry and construction.

The governmental Scientific and Technical Committee of the Council of Ministers USSR, which was formed by that law, was charged with studying the achievements of science and technology at home and abroad, and also those of advanced industry, with giving wide publicity to these achievements, with publishing scientific and technical literature, and with supervising the development and application of new technology in the national economy.

The law makes the chairman of the Committee a member of the Council of Ministers of the USSR.

It is clear from the facts we have given that the Scientific and Technical Committee of the Council of Ministers of the USSR is not an organ that is called upon to exercise control over all the branches of science. And it is not even faced with tasks of controlling the organization of scientific work in the sphere of technical sciences as a whole. Its tasks, as we have seen, are more restricted and more purposeful.

General questions of the organization of scientific work in this country will, as before, be decided directly by the Council of Ministers of the USSR.

Gosplan SSSR, equally with the Scientific and Technical Committee, is called upon to give much help to the government in this matter, since it is the scientific planning and economic organ of the national

economy, and is obliged by law to study the requirements of the national economy from all sides, and to prepare current and future plans for the development of the national economy, taking the achievements of science and technology into account.

The part played by the Academy of Sciences of the USSR in deciding questions of further improvement in the organization of the control of scientific establishments, and of the organization of scientific work as a whole, will undoubtedly grow in importance, as will the part played by the branch academies of sciences, as scientific centres for the Union, uniting the most outstanding scientists in this country.

PLANNING AND DESIGN INSTITUTES, LABORATORIES, AND HIGHER EDUCATIONAL INSTITUTIONS IN AND NEAR MOSCOW.

Below we publish the second* of a series of lists of institutions in the USSR.

The present list, containing nearly 250 entries, is based on information collected in September 1958 and published in "Moskva: kratkaya adresno-spravochnaya kniga", Moscow 1958, pp. 87-98. Each entry gives (1) the transliterated official abbreviation and/or name of the institution, (2) translated name of institution, (3) address, and (4) telephone number. The entries are arranged in the cyrillic alphabetical order of the "key word", and this word is underlined to facilitate the use of the list.

-Ed.

PLANNING AND DESIGN INSTITUTES

VODOKANALPROEKT (GOS. PROEKTNYI INSTITUT PO IZYSKANIYAM I PROEKTIROVANIYU NARUZHNYKH VODOPROVODOV, KANALIZATSII I GIDROTEKHNICHESKIKH SOORUZHENII (GPI))

(State Planning Institute for Investigating and Planning External Water Supplies, Sewers and Hydrotechnical Structures)
Moskva B, Kochki 17a; tel. G5-47-74

GIDROPROEKT im. S. YA. ZHUK (VSES. PROEKTNO-IZYSKATEL'SKII I NAUCHNO-ISSLED. INSTITUT)

("S. Ya. Zhuk" All-Union Planning, Investigating and Scientific Research Institute (for hydrotechnical structures))
Moskva, Sadovaya-Chernogryazskaya ul. 13/21; tel. B7-46-41

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* the first list, "Academies and Research Institutes in and near Moscow", was published in the NLL Translations Bulletin, March 1961, pp. 179-218.

GIDRORYBPROEKT (GOS. INSTITUT PO PROEKTIROVANIYU GIDROTEKHNICHESKIKH RYBOVODNO-MELIORATIVNYKH I PRUDOVYKH SOORUZHENII)

(State Institute for Planning Hydrotechnical Structures for the Reclamation of Fisheries and Fish Ponds)
Moskva, Spartakovskaya pl. 12; tel. E1-73-83

GIDROENERGOPROEKT (VSES. GOS. PROEKTNYI INSTITUT)

(All-Union State Planning Institute (for hydro-electric power plants))
Moskva, 2-ya Baumanskaya ul. 7; tel. E1-98-21

GIPROAVTOPROM (GOS. INSTITUT PO PROEKTIROVANIYU ZAVODOV AVTOMOBIL'NOI PROMYSHLENNOSTI)

(State Institute for Planning Works for the Motor Industry)
Moskva, 1-i Kadashevskii p. 12; tel. V1-28-47

GIPROAVTOTRANS (GOS. INSTITUT PO PROEKTIROVANIYU AVTOREMONTNYKH I AVTOTRANSPORTNYKH PREDPRIYATII)

(State Institute for Planning Motor Vehicle Repair and Motor Transport Establishments)
Moskva, Sofiiskaya nab. 34; tel. komm. V1-85-40. dob. 1-70

GIPROBUM (MOSKOVSKII FILIAL GOS. INSTITUTA PO PROEKTIROVANIYU PREDPRIYATII TSELLYULOZNOI I BUMAZHNOI PROM-STI)

(Moscow branch, State Institute for the Planning of Establishments for the Cellulose and Paper Industry)
Moskva, 1-i Perevedenovskii p. 40; tel. E1-78-80

GIPROVODKHOZ (VSES. GOS. INSTITUT PO PROEKTIROVANIYU VODOKHOZYAISTVENNOGO I MELIORATIVNOGO STROITEL'STVA)

(All-Union State Institute for Planning Construction for Water Resources and Improvements)
Moskva, Orlikov p. 1/11; tel. K2-96-53

GIPROVUZ (GOS. SOYUZNYI INSTITUT PO PROEKTIROVANIYU VYSSHIKH UCHEBNYKH ZAVEDENII)

(State Union Institute for Planning Higher Education Establishments)
Moskva, Stremyannyi p. 28; tel. V1-09-69

GIPROGAZOOCHISTKA (GOS. INSTITUT PO PROEKTIROVANIYU GAZOOCHISTNYKH SOORUZHENII)

(State Institute for Planning Gas Purification Installations)
Moskva, 15-ya Parkovaya ul. 10; tel. E5-17-42

GIPROGAZTOPPROM (GOS. SOYUZNYI PROEKTNYI INSTITUT)

(State Union Planning Institute (for the gas and fuel industry))
Moskva, ul. Dimitrova 33/13; tel. V1-38-98

GIPROGOR (GOS. INSTITUT PO PROEKTIROVANIYU GORODOV)

(State Institute for Town Planning)
Moskva, 1-ya ul. Yamskogo polya 15; tel. D3-15-26

GIPRODORTRANS (GOS. INSTITUT PO PROEKTIROVANIYU DOROG, TRANSPORTNYKH PREDPRIYATII I SOORUZHENII)

(State Institute for Planning Roads, Transport Undertakings and Structures)
Moskva, Sretenka 27/29; tel. K5-80-64

GIPRODREVPROM (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII DEREVOOBRABATYVAYUSHCHEI PROM-STI)

(State Institute for Planning Woodworking Industry Establishments)
Moskva, Polkovaya ul. 17; tel. I1-30-83

GIPROZHIR (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for the fats industry))
Moskva, 1-i Shchipkovskii p. 26; tel. V1-31-27

GIPROZDRAV (GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU MEDIKO-SANITARNYKH LECHEBNO-PROFILAKTICHESKIKH UCHREZHDENII)

(State Planning Institute for the Design of Medical, Sanitation, and Prophylactic Treatment Centres)
Moskva, 2-i Troitskii per. 6a; tel. I1-85-66

GIPROIV (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII PROM-STI ISKUSSTVENNOGO VOLOKNA)

(State Institute for the Planning of Establishments for the Synthetic Fibres Industry)
g. Mytishchi, Mosk. obl., ul. Kolontsova 5; tel. I4-73-65

GIPROKINOPOLIGRAF (GOS. PROEKTNYI INSTITUT)

(State Planning Institute for Cinematography and Printing)
Moskva, ul. 25-go Oktyabrya 5/1; tel. B3-96-47

GIPROKOMMUNVODOKANAL (GOS. INSTITUT PO PROEKTIROVANIYU I IZYSKANIYU GORODSKOGO VODOPROVODA I VODOKANALIZATSII)

(State Institute for the Planning and Study of Municipal Water Supply and Sewerage Systems)
Moskva, Rybnyi p. 3; tel. K5-00-47

GIPROKOMMUNDORTRANS (GOS. INSTITUT PROEKTIROVANIYA KOMMUNAL'NO DOROZHNYKH TRANSPORTNYKH SOORUZHENNII)

(State Institute for the Planning of Public Road Transport Constructions)
Moskva, Khrustal'nyi p. 1, pom. 93; tel. K4-17-08

GIPROKOMMUNSTROI (GOS. RESPUBLIKANSKII PROEKTNYI INSTITUT)

(State Republic Planning Institute (of municipal construction))
Moskva, Kuznetskii most 20; tel. K4-82-50

GIPROKOMMUNENERGO (GOS. RESPUBLIKANSKII PROEKTNYI INSTITUT)

(State Republic Planning Institute (for municipal power supply))
Moskva, ul. Razina 7; tel. B3-38-04

GIPROLESMASH (GOS. INSTITUT PO PROEKTIROVANIYU NOVYKH MASHIN I MEKHANIZMOV DLYA LESOZAGOTOVOK I SPLAVA)

(State Institute for the Design of New Machines and Mechanisms for Lumbering and Floating)
Moskva, 2-i Shlyuzovoi p. 4; tel. V1-36-87

GIPROLESPROM (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII LESOZAGOTOVITEL'NOI, LESOSPLAVNOI I DEREVOOBRABATYVAYUSHCHEI PROM-STI)

(State Institute for the Planning of Undertakings in the Lumber, Timber-Floating and Woodworking Industry)
Moskva B, Gruzinskaya ul. 70; tel. D1-88-12

GIPROLESKHIM (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII LESOKHIMICHESKOI PROM-STI)

(State Institute for the Planning of Establishments for the Wood Chemical Industry)
Moskva, Rybnyi p. 2, pom. 29; tel. B1-15-43

GIPROMASH (MOSKOVSKOE OTDELENIE GOS. INSTITUTA PO PROEKTIROVANIYU ZAVODOV MASHINOSTROENIYA)

(Moscow Division, State Institute for Planning Machine-Building Plants)
Moskva, Naprudnyi p. 8; tel. I1-16-25

GIPROMEDPROM (GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU MEDITSINSKOI PROM-STI)

(State Planning Institute for Design in the Medical Equipment Industry)
Moskva, Krivokolennyi p. 12; tel. B3-89-40

GIPROMEZ (GOS. SOYUZNYI INSTITUT PROEKTIROVANIYA METALLURGICHESKIKH ZAVODOV)

(State Union Institute for Planning Metallurgical Plants)
Moskva, prosp. Mira 101; tel. I1-66-44

GIPROMOLOKO (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII MOLOCHNOI PROM-STI)

(State Institute for the Planning of Undertakings in the Milk Industry)
Moskva, Nov. Basmannaya ul. 23; tel. E1-72-14

GIPROMYASO (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII MYASNOI PROM-STI)

(State Institute for the Planning of Meat Industry Establishments)
Moskva, Bannyi p. 9/11; tel. I1-11-76

GIPRONEFTEZAVOD (GOS. INSTITUT PO PROEKTIROVANIYU NEFTEPERERABATYVAYUSHCHIKH ZAVODOV)

(State Institute for Planning Oil Refineries)
Moskva, ul. Fridrikha Engel'sa 32; tel. E1-96-26

GIPRONEFTEMASH (GOS. NAUCHNO-ISSLED. I PROEKTNYI INSTITUT NEFTYANOGO MASHINOSTROENIYA)

(State Scientific Research and Design Institute for Oil (petroleum) Machinery)
Moskva, 4-i Verkhn. Mikhailovskii pr. 8a; tel. V2-16-63

GIPROPISHCHEPROM (GOS. SOYUZNYI PROEKTNYI INSTITUT PO PROEKTIROVANIYU PREDPRIYATII PISHCHEVOI PROM-STI)

(State Union Planning Institute for the Design of Food Industry Establishments)
Moskva, Butyrskii val 68; tel. komm. D3-15-40, dob. 34

GIPROPROMTRANSSTROI (GOS. INSTITUT PROEKTIROVANIYA PROMYSHLENNO-TRANSPORTNOGO STROITEL'STVA)

(State Institute for the Planning of Industrial and Transport. Constructional Work)
Moskva, Basmannyi tup. 6a; tel. B3-94-54

GIPROPROS (RESPUBLIKANSKII PROEKTNYI INSTITUT)

(Republic Planning Institute)*
Moskva, Shabolovka 49; tel. V2-52-22

GIPRORECHTRANS (GOS. INSTITUT PROEKTIROVANIYA NA RECHNOM TRANSPORTE)

(State Institute for River Transport Planning)
Moskva, Okruzhnoi pr. 14; tel. E5-23-50

GIPRORYBPROM (GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU PREDPRIYATII I MASHIN RYBNOI PROM-STI)

(State Planning Institute for the Planning and Design of Undertakings and Machines for the Fish Industry)
Moskva B, Cherkasskii p. 4; tel. K5-70-05

GIPROSAKHAR (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for undertakings in the sugar industry))
Moskva, Komsomol'skaya pl. 1a; tel. B8-18-91

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*for educational establishments (?) - Ed.

GIPROSVYAZ (GOS. INSTITUT PO IZYSKANIYAM I PROEKTIROVANIYU SOORUZHENII SVYAZI)

(State Institute for the Study and Design of Structures for Communications)
Moskva, ul. Kirova 40; tel. B8-11-74

GIPROSEL'KHOZ (VSES. GOS. INSTITUT PO PROEKTIROVANIYU PROMYSHLENNYKH ZDANII I SOORUZHENII SEL'SKOGO KHOZYAISTVA)

(All-Union State Institute for Planning Industrial Buildings and Structures for Agriculture)
Moskva, Orlikov p. 1/11; tel. K2-97-25

GIPROSEL'ELEKTRO (VSES. GOS. INSTITUT PO PROEKTIROVANIYU ELEKTRIFIKATSII SEL'SKOGO KHOZYAISTVA)

(All-Union State Institute for the Planning of Rural Electrification)
platf. Veshnyaki, M.-Ryazanskoi zh.d., Internatsional'naya ul. 2; tel. Zhl-12-07

GIPROSPIRTVINO (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for the alcohol and wine industry)
Moskva, Pervomaiskaya ul. 58a; tel. E5-32-52

GIPROSPORT (GOS. INSTITUT PO PROEKTIROVANIYU SPORTIVNYKH SOORUZHENII)

(State Institute for the Design of Constructions for Sport)
Moskva, Sovetskaya ul. 80; tel. E3-44-85

GIPROSTANDARTPROM (GOS. INSTITUT PO PROEKTIROVANIYU MALOETAZHNYKH SBORNYKH DOMOV)

(State Institute for the Design of Small* Prefabricated Houses)
Moskva, Sofiiskaya nab. 30; tel. V1-35-10

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* literally: "with few storeys" - Tr.

GIPROSTANOK (GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU STANKOSTROITEL'NYKH, INSTRUMENTAL'NYKH, ABRAZIVNYKH ZAVODOV I ZAVODOV KUZNECHNO-PRESSOVOGO MASHINOSTROENIYA)

(State Planning Institute for the Design of Tool, Instrument, Abrasive and Forging and Pressing Machinery Plants)
Moskva, 5-i Donskoi pr. 10; tel. V2-51-63

GIPROSTROIINDUSTRIYA (VSES. GOS. PROEKTNO-KONSTRUKTORSKII INSTITUT)

(All-Union State Planning and Construction Institute (for the building industry))
Moskva, Novoslobodskaya ul. 54/56; tel. D0-45-23

GIPROSTROIMATERIALY (VSES. PROEKTNYI INSTITUT PO PROEKTIROVANIYU PREDPRIYATII PROM-STI STROITEL'NYKH MATERIALOV)

(All-Union Planning Institute for the Planning of Undertakings in the Building Materials Industry)
Moskva, 1-i D'yakovskii p. 3; tel. B6-06-00

GIPROSTROMMEKHANIZATSIYA (GOS. VSES. INSTITUT PO PROEKTIROVANIYU MEKHANIZATSII PROIZVODSTVA)

(State All-Union Institute for the Planning the Mechanization of Production)
Moskva, Kostyanskii p. 4; tel. B3-67-00

GIPROTEATR (GOS. INSTITUT PO PROEKTIROVANIYU TEATRAL'NO-ZRELISHCHYKH PREDPRIYATII)

(State Institute for the Design of Theatres and Places of Entertainment)
Moskva, Leningradskii prosp. 47; tel. D7-61-27

GIPROTIS (GOS. INSTITUT TIPOVOGO PROEKTIROVANIYA I TEKHNICHESKIKH ISSLEDOVANII)

(State Institute for Prototype Design and Technical Research)
g. Babushkin, Mosk. obl., Sovetskaya ul. 13a; tel. komm. I1-20-00, dob. 10-49

GIPROTOPPROM (GOS. INSTITUT PO RAZVEDKE UGOL'NYKH I TORFYANYKH MESTOROZHDENII I PROEKTIROVANIYA PREDPRIYATII TOPLIVNOI PROM-STI)

(State Institute for Prospecting for Coal and Peat Deposits and the Planning of Undertakings of the Fuel Industry)
Moskva, Shmitovskii pr. 2; tel. D5-57-82

GIPROTORF (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for the peat industry))
Moskva, ul. 25-go Oktyabrya, 10/2; tel. B3-97-56

GIPROTORFRAZVEDKA (GOS. PROEKTNO-IZYSKATEL'SKII INSTITUT)

(State Planning and Research Institute (for prospecting for the peat industry))
Moskva, ul. Razina 3, pom. 61; tel. B3-75-79

GIPROTRANSKAR'ER (GOS. INSTITUT PO GEOLOGICHESKIM IZYSKANIYAM I PROEKTIROVANIYU SHCHEBENOCHNYKH ZAVODOV I KAR'EROV)

(State Institute for Geological Prospecting and the Planning of Gravel Works and Quarries)
Moskva, Sadovaya-Chernogryazskaya ul. 8; tel. E2-68-20

GIPROTRUBOPROVOD (GOS. INSTITUT PO PROEKTIROVANIYU MAGISTRAL'NYKH TRUBOPROVODOV)

(State Institute for the Design of Main Pipelines)
Moskva, ul. Dzerzhinskogo 20; tel. K4-22-27

GIPROTRANSTEI (GOS. INSTITUT TEKHNIKO-EKONOMICHESKIKH IZYSKANII I PROEKTIROV-ANIYA ZHELEZNODOROZHNOGO TRANSPORTA)

(State Institute for Technical and Economic Research and Planning of Railway Transport)
Moskva, Sadovaya-Chernogryazskaya ul. 8; tel. E2-82-31

GIPROTYAZHMASH (GOS. INSTITUT PO PROEKTIROVANIYU ZAVODOV TYAZHELOGO MASHINOSTROENIYA)

(State Institute for Planning Heavy Machine Building Works)
Moskva, Vorontsovskaya ul. 1/3; tel. Zh1-15-93

GIPROUGLEAVTOMATIZATSIYA (GOS. PROEKTNO-KONSTRUKTORSKII INSTITUT)

(State Design and Construction Institute (for automation in the coal industry))
Moskva, 1-i Yuzhnoportovyi pr. 17; tel. Zh 5-26-59

GIPROUGLEMASH (GOS. PROEKTNO-KONSTRUKTORSKII I EKSPERIMENTAL'NYI INSTITUT UGOL'NOGO MASHINOSTROENIYA)

(State Institute for Design, Construction and Experimental Research for Coal Machine Building)
Moskva, ul. Markhlevskogo 18; tel. K5-40-31

GIPROKHOLOD (GOS. INSTITUT PO PROEKTIROVANIYU KHOLODIL'NIKOV, FABRIK MOROZHENOGO, ZAVODOV SUKHOGO I VODNOGO L'DA I ZHIDKOI UGLEKISLOTY)

(State Institute for the Design of Refrigeration Plant, Ice Cream Factories, and Factories of Dry Ice, Ice and Liquid Carbon Dioxide)
Moskva, ul. Razina 26; tel. B8-85-75

GIPROTSVETMETOBRABOTKA (GOS. NAUCHNO-ISSLED. I PROEKTNYI INSTITUT PO OBRABOTKE TSVETNYKH METALLOV)

(State Scientific Research and Design Institute for the Working of Non-ferrous Metals)
Moskva, Pyzhevskii p. 7a; tel. V1-50-55

GIPROSHAKHTOSTROIMASH (GOS. PROEKTNO-KONSTRUKTORSKII I NAUCHNO-ISSLED. INSTITUT PO SOZDANIYU NOVYKH MASHIN I MEKHANIZMOV GORNOPROKHODCHESKIKH RABOT)

(State Design, Construction and Scientific Research Institute for the Design of New Machines and Devices for Shaft-Sinking Operations)
Moskva, 8-ya Kozhukhovskaya ul. 7; tel. Zh-36-73

GIPROENERGOPROM (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for the power engineering industry))
Moskva B, Savvinskii p. 9; tel. G6-03-29

GOSSTROIPROEKT (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for construction))
Moskva B, Kochki 17a; tel. komm. G6-00-60, dob. 44

GOSGORKHIMPROEKT (GOS. SOYUZNYI INSTITUT PO PROEKTIROVANIYU PREDPRIYATII GORNOKHIMICHESKOI PROM-STI)

(State Union Institute for the Planning of Undertakings of the Mining-Chemical Industry)
Moskva, 15-ya Parkovaya ul. 17; tel. E5-17-55

GOSKHIMPROEKT (GOS. SOYUZNYI INSTITUT PO PROEKTIROVANIYU SPETSIAL'NYKH SOORUZHENII, ZDANII, SANITARNO-TEKHNICHESKIKH I ENERGETICHESKIKH USTROISTV DLYA PREDPRIYATII KHIMICHESKOI PROM-STI)

(State Union Institute for the Design of Special Structures, Buildings, Sanitation and Power Installations for Establishments of the Chemical Industry)
Moskva, Dushinskaya ul. 17; tel. Zh 4-15-49

DORMOSTPROEKT (INSTITUT PO PROEKTIROVANIYU DOROG, MOSTOV I NABEREZHNYKH)

(Institute for Planning Roads, Bridges, and Embankments)
Moskva, ul. Karla Marksa 20; tel. E1-89-89

METROGIPROTRANS (GOS. PROEKTNO-IZYSKATEL'SKII INSTITUT)

(State Planning and Research Institute (for underground railways))
Moskva, Novokuznetskaya ul. 43/16; tel. V3-22-30

MOSGAZPROEKT (PROEKTNYI INSTITUT)

(Planning Institute (of the Moscow gas administration))
Moskva, Spartakovskaya ul. 2a; tel. E7-51-52

MOSGIPROTRANS (MOSK. GOS. PROEKTNO-IZYSKATEL'SKII INSTITUT)

(Moscow State Planning and Research Institute (for transport))
Moskva, Novosushchevskaya ul. 26; tel. E2-63-43

MOSINZHPROEKT (MOSK. PROEKTNYI INSTITUT)

(Moscow Planning Institute (for engineering))
Moskva, Valovaya ul. 11-19; tel. V1-01-01

MOSOBLPROEKT (MOSK. OBL. PROEKTNYI INSTITUT)

(Moscow Province Planning Institute)
Moskva, ul. Chkalova 36; tel. K7-87-05

MOSPROEKT (INSTITUT PO PROEKTIROVANIYU ZHILISHCHNO-GRAZHDANSKOGO STROITEL'STVA V. G. MOSKVE)

(Institute for the Planning of Housing and Civil Construction in the City of Moscow)
Moskva, 1-ya Brestskaya ul. 13/14; tel. D0-51-93

ORGENERGOSTROI (VSES. INSTITUT PO PROEKTIROVANIYU ORGANIZATSII ENERGETICHESKOGO STROITEL'STVA), MOSKOVSKII FILIAL.

(All-Union Institute for Planning of the Organization for Power-Industry Construction, Moscow branch)
Moskva, Kitaiskii pr. 7; tel. K5-97-26

VSES. PROEKTNO-TEKHNOLOGICHESKII INSTITUT GLAVNIIPROEKTA PRI GOSPLANE SSSR (VPTI)

(All-Union Design and Technological Institute of Glavniiproekt of Gosplan (the State planning committee of the Council of Ministers) of the USSR)
Moskva, Prosp. Mira 106; tel. K5-22-40

PROEKTNYI INSTITUT MINISTERSTVA ZDRAVOOKHRANENIYA RSFSR

(Planning Institute of the Ministry of Health of the RSFSR)
Moskva, pr. Vladimirova 6; tel. K4-50-83

GOS. SOYUZNI PROEKTNYI INSTITUT MINISTERSTVA SVYAZI SSSR

(State Union Planning Institute of the Ministry of Communications of the USSR)
Moskva, ul. Kirova 40; tel. K5-46-13

GOS. PROEKTNYI INSTITUT No. 1 GOSPLANA RSFSR (GPI No. 1)

(State Planning Institute No. 1 of Gosplan (the State planning committee of the Council of Ministers) of the RSFSR)
Moskva B, Savvinskii p. 10; tel. G6-98-83

PROEKTNYI INSTITUT No. 2. MINISTERSTVA STROITEL'STVA RSFSR

(Planning Institute No. 2 of the Ministry of Construction of the RSFSR)
Moskva, Volokolamskoe shosse 5; tel.. D8-24-12

GOS. PROEKTNYI INSTITUT No. 5 MINISTERSTVA STROITEL'STVA RSFSR (GPI No. 5)

(State Planning Institute No. 5 of the Ministry of Construction of the RSFSR)
Moskva, Volokolamskoe shosse 5; tel. D8-26-03

GOS. PROEKTNYI INSTITUT No. 6 MINISTERSTVA STROITEL'STVA RSFSR (GPI No. 6)

(State Planning Institute No. 6 of the Ministry of Construction of the RSFSR)
Moskva, Volokolamskoe shosse 5; tel. D8-08-71

PROEKTSTAL'KONSTRUKTSIYA (GOS. INSTITUT PO PROEKTIROVANIYU, ISSLEDOVANIYU I ISPYTANIYU STAL'NYKH KONSTRUKTSII I MOSTOV)

(State Institute for Planning, Research and Testing of Steel Structures and Bridges)
Moskva B, Kochki 17a; tel. G5-59-50

PROMZERNOPROEKT (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for flour, groats and combined-fodder establishments and grain elevators and warehouses))
Moskva, Trifonovskaya ul. 47; tel. I1-95-87

PROMSTROIPROEKT (GOS. PROEKTNYI INSTITUT, GPI)

(State Planning Institute (for the construction industry))
Moskva B, Kochki 17a; tel. G5-59-29

PROMSTAL'KONSTRUKTSIYA (PROEKTNYI INSTITUT)

(Planning Institute (for steel structures))
Moskva, Sadovaya-Kudrinskaya ul. 27a; tel. D0-56-02

PROMTRANSPROEKT (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for industrial transportation))
Moskva, Bobrov p. 3; tel. B8-60-32

PROMENERGOPROEKT (GOS. SOYUZNYI PROEKTNYI INSTITUT, GSPI)

(State Union Planning Institute (for the power industry))
Moskva, Semenovskaya nab. 2/1; tel. E1-85-88

REZINOPROEKT (GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII REZINOVOI PROM-STI)

(State Institute for Planning Rubber Industry Undertakings)
Moskva, ul. Chkalova 14-16; tel. K7-58-86

ROSGIPROVODKHOZ (RESPUBLIKANSKII GOS. INSTITUT PO PROEKTIROVANIYU VODOKHOZYAISTVENNOGO I MELIORATIVNOGO STROITEL'STVA)

(Republic State Institute for the Planning of Water Resources and Reclamation Development)
Moskva, Pushlinskaya ul. 32; tel. B9-32-25

ROSGIPROGORSEL'STROI (RESPUBLIKANSKII PROEKTNYI INSTITUT)

(Republic Planning Institute (for town and rural development))
Moskva, Ul'yanovskaya ul. 54; tel. K7-67-05

ROSGIPROSOVKHOZSTROI (RESPUBLIKANSKII GOS. INSTITUT PO PROEKTIROVANIYU SOVKHOZNOGO STROITEL'STVA)

(Republic State Institute for Planning Sovkhoz (Soviet state farm) Development)
Moskva, Manezhnaya ul. 7; tel. K5-47-03

ROSSTROMPROEKT (GOS. RESPUBLIKANSKII INSTITUT PO PROEKTIROVANIYU ZAVODOV STROITEL''NYKH MATERIALOV)

(Stata Republic Institute for the Planning of Factories for Building Materials)
Moskva, 2-ya Yaroslavskaya ul. 17; tel. I3-93-68

SANTEKHPROEKT (GOS. PROEKTNYI INSTITUT, GPI)

(State Planning Institute (for sanitary engineering))
Moskva, Nizhn. Pervomaiskaya ul. 46; tel. E5-47-41

SOYUZGIPROTORG (VSES. GOS. INSTITUT PO PROEKTIROVANIYU PREDPRIYATII TORGOVLI I OBSHCHESTVENNOGO PITANIYA)

(All-Union State Institute for the Design of Food Trade and Public Nutrition Establishments)
Moskva, ul. Kirova 47; tel. K2-73-20

SOYUZDORPROEKT (GOS. PROEKTNYI INSTITUT PO IZYSKANIYAM I PROEKTIROVANIYU AVTOMOBIL'NYKH DOROG)

(State Planning Institute for Investigation and Planning of Motor Roads)
Moskva, Sofiiskaya nab. 34; tel. komm. V1-85-40, dob. 3-53

SOYUZMORPROEKT (GOS. INSTITUT PO PROEKTIROVANIYU MORSKIKH PORTOV I SUDOREMONTNYKH PREDPRIYATII)

(State Institute for Planning Sea-Ports and Ship Repair Yards)
Moskva B, Koptevskii pr. 10-12; tel. komm D0-00-17, dob. 08

STAL'PROEKT (GOS. SOYUZNYI PROEKTNYI INSTITUT PO PROEKTIROVANIYU AGREGATOV STALELITEINOGO I PROKATNOGO PROIZVODSTVA)

(State Union Planning Institute for the Design of Units for Steel Foundry and Rolling Production)
Moskva, Gogolevskii bul. 8; tel. B3-15-34

TEPLOPROEKT (VSES. NAUCHNO-ISSLED. I PROEKTNYI INSTITUT VNIPI)

(All-Union Scientific Research and Planning Institute (for heat engineering))
g. Babushkin, Mosk. obl., Sovetskaya ul. 13a; tel. komm I1-20-00, dob. 10-40)

TEPLOELEKTROPROEKT (VSES. GOS. PROEKTNYI INSTITUT, TEP)

(All-Union State Planning Institute for Thermal Electric Power Stations)
Moskva, Spartakovskaya ul. 2a; tel. E1-41-87

TSENTR. INSTITUT TIPOVYKH PROEKTOV (TIPPROEKT)

(Central Institute of Standardized Designs)
Moskva, Spartakovskaya ul. 2a, korp. "V"; tel. E7-52-32

TRANSELEKTROPROEKT (GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU ELEKTRIFITSIROVANNYKH DOROG I ENERGETICHESKIKH USTANOVOK)

(State Planning Institute for the Design of Electrified Railway Lines and Power Installations)
Moskva, 3-ya Mytishchinskaya ul. 10; tel. I1-46-28

TYAZHPROMELEKTROPROEKT (GOS. PROEKTNYI INSTITUT, GPITPEP)

(State Planning Institute (for the heavy electrical industry))
Moskva, Shcherbakovskaya ul. 57a; tel. E5-34-52

FUNDAMENTPROEKT (GOS. INSTITUT PO PROEKTIROVANIYU OSNOVANII I FUNDAMENTOV)

(State Institute for the Design of Bases and Foundations)
Moskva, Volokolamskoe shosse 5; tel. D8-04-81

TSENTROGIPROSHAKHT (VSES. TSENTR. GOS. PROEKTNYI INSTITUT PO PROEKTIROVANIYU SHAKHT)

(All-Union Central State Planning Institute for the Planning of Mines)
Moskva, ul Kazakova 8; tel. E2-99-33

TSENTROPROMPROEKT (TSENTR. PROEKTNYI INSTITUT)

(Central Planning Institute (for the producers' cooperatives*))
Moskva B, Devyatinskii p. 15; tel. komm. D2-15-34

ELEKTROPROEKT (GOS. PROEKTNYI INSTITUT)

(State Planning Institute (for electricity))
Moskva, Volokolamskoe shosse 5; tel. D8-14-81

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*? -Ed.

LABORATORIES

GOR. AVIAMODEL'NAYA LABORATORIYA (GAML)

(Municipal Aircraft Model Laboratory)
Moskva, Novopeschanaya ul. 23/7; korp. 39; tel. D7-73-17

TSENTR. AVIAMODEL'NAYA LAB. (TsAML)

(Central Aircraft Model Laboratory)
g. Tushino, Mosk. obl., Osoaviakhimovskii kvartal 4;
tel. komm. D8-50-15, dob. 3-36

LAB. AVTOKLAVNYKH SILIKATNYKH MATERIALOV

(Laboratory for Autoclave Silicate Materials)
Moskva, Donskaya pl. 1; tel. V2-04-24

TSENTR. LAB. AVTOMATIKI (TsLA)

(Central Laboratory for Automation)
Moskva, ul. Kirova 36; tel. B1-28-21

VSES. NAUCHNO-ISSLED. LAB. ALMAZNOGO INSTRUMENTA I ZAMENITELEI ALMAZA (VNILAlmaz)

(All-Union Scientific Research Institute Laboratory for Diamond Tools and Diamond Substitutes)
Moskva, ul. 25 Oktyabrya 10; tel. K4-54-27

TSENTR. OPYTNO-PROIZVODSTVENNAYA LAB. PO BOR'BE S AMBARNYMI VREDITELYAMI (TsOPL)

(Central Experimental and Manufacturing Laboratory for the Fight Against Warehouse* Pests)
Moskva, Komsomol'skaya pl. 1a; tel. B8-99-29

LAB. ANIZOTROPNYKH STRUKTUR (LAS AN SSSR)

(Laboratory for Anisotropic Structures (of the AS USSR))
Moskva, 1-i Kolobovskii p. 1/6; tel. B1-70-74

LAB. VETROSILOVYKH USTANOVOK

(Laboratory for Wind-Power Installations)
g. Istra, Mosk. obl. +

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* or? Granary - Ed.

+ no telephone number given - Tr.

TSENTR. NAUCHNO-ISSLED. LAB. VINODELIYA I SEVERNOGO VINOGRADARSTVA (TsNILV i SV)

(Central Scientific Research Laboratory for the Wine Making and for Viticulture in the North)
st. Kuchino, Gor'kovskoi zh. d.; tel. komm. Zh4-00-28 dob. 1-20 (2 rings)

TSENTR. NAUCHNO-ISSLED. LAB. VINODEL'CHESKOI PROM-STI (TsNILVP)

(Central Scientific Research Laboratory for the Wine Making Industry)
Moskva, 4-i Syromyatnicheskii p. 1; tel. K7-45-29

LAB. VULKANOLOGII

(Laboratory of Vulcanology)
Moskva, Staromonetnyi p. 35; tel. komm. V1-05-08, dob. 14.

TSENTR. LAB. VYSOKOVOL'TNOI SETI MOSENERGO

(Central Laboratory of the Mosenergo (Moscow regional power system administration) High Voltage Grid)
Moskva, 2-i Kozhukhovskii pr. 29; tel. komm. Zh5-00-05, dob. 9

GEL'MINTOLOGICHESKAYA LAB.

(Helminthological Laboratory)
Moskva, Leninskii prosp. 33; tel. V2-57-46

LAB. OTDALENNOI GIBRIDIZATSII

(Laboratory for Remote Hybridization)
Moskva, Vladykinskoe shosse, territoriya Glavnogo botanicheskogo sada; tel. I3-92-87

TSENTR. NAUCHNO-ISSLED. LAB. GIGIENY I EPIDEMIOLOGII (TsNILGE)

(Central Scientific Research Laboratory for Hygiene and Epidemiology)
platf. Yauza Severnoi zh. d., bol'nitsa im. Semashko;
tel. E2-42-50

LAB. GIDROGEOLOGICHESKIKH PROBLEM im. F. P. SAVARENSKOGO (LGGP)

("F. P. Savarenskii" Laboratory of Hydrogeological Problems)
Moskva, Staromonetnyi p. 35; tel. V1-11-88

NAUCHNO-ISSLED. LAB. GLAVMOSZHELEZOBETONA* MOSGORISPOLKOMA+ (NILGLavmoszhelezobetona)

(Scientific Research Laboratory of the Glavmoszhelezobeton of Mosgorispolkom)
Moskva, ul. Plekhanova 11/13; tel. Zh4-37-83

TSENTR. NAUCHNO-ISSLED. LAB. GOSGORTEKHNADZORA RSFSR (TsNIL)

(Central Scientific Research Laboratory of Gosgortekhnadzor**)
Moskva, ul. 25 Oktyabrya 4; tel. K4-69-65

LAB. DEKORATIVNOGO KAMNYA

(Laboratory for Ornamental Stone)
Moskva, Leninskii prosp. 18; tel. V2-45-21

TSENTR. ISSLED. LAB. PO DOROZHNOSTROITEL'NYM MATERIALAM I KONSTRUKTSIYAM

(Central Research Laboratory for Road-Building Materials and Designs)
Moskva, Gospital'nyi val 5 korp. 13; tel. E1-85-39

NAUCHNO-ISSLED. LAB. GLAVNOGO UPRAVLENIYA ZHIVOTNOVODSTVA I VETERINARII MIN. SEL'SKOGO KHOZYAISTVA RSFSR

(Scientific Research Laboratory of the Main Administration of Cattle-Breeding and Veterinary Science of the Ministry of Agriculture of the RSFSR)
pos. Kosino Ukhtomskogo raiona, Mosk. obl., Shkol'naya ul. 21; tel. komm. Zh1-90-20, dob. 2-62

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* Glavmoszhelezobeton - Main division for Reinforced Concrete of the City of Moscow - Tr.

+ Mosgorispolkom - Executive Committee of Moscow City Council of Workers' Deputies. - Tr.

** Gosgortekhnadzor - State City Technical Inspectorate - Ed.

TSENTR. NAUCHNO-ISSLED. LAB. ZHIROVOI PROM-STI

(Central Scientific Research Laboratory of the Fats Industry)
Moskva, ul. Gertsena 29; tel. B1-14-19

TSENTR. LAB. PO KARANTINU SEL'SKOKHOZYAISTVENNYKH RASTENII

(Central Laboratory for the Quarantine of Agricultural Plants)
Moskva, Orlikov p. 1/11; tel. K2-92-11

TSENTR. KINOLABORATORIYA (SHKOLFIL'M) MINISTERSTVA PROSVESHCHENIYA RSFSE

(Central Film Laboratory of the Ministry of Education of the RSFSE)
Moskva, Uspenskii p. 3; tel. K4-17-18

TSENTR. KINOLABORATORIYA MINISTERSTVA VYSSHEGO OBRAZOVANIYA SSSR

(Central Film Laboratory of the Ministry of Higher Education of the USSR)
Moskva, Volokolamskoe shosse 15a; tel. D8-01-41

LAB. KLIMATOLOGII

(Climatology Laboratory)
Moskva, ul. A. N. Ostrovskogo 8; tel. V1-37-42

TSENTR. NAUCHNO-EKSPERIMENTAL'NAYA LAB. KOZHI (TsNELKozh) *

(Central Scientific Experimental Laboratory for Leather)
Moskva M, Drovyanoi p. 5; tel. K7-49-84

TSENTR. NAUCHNO-EKSPERIMENTAL'NAYA KOZHOBUVNAYA LAB. (TsNELKozh)*

(Central Scientific Experimental Laboratory for Leather Footwear)
Moskva, Kropotkinskaya nab. 17; tel. G6-67-39

MOSK. OBL. KONTROL'NO-SEMENNAYA LAB.

(Moscow Province Seed Control Laboratory)
Moskva, Rozhdestvenskii bul. 14; tel. B1-93-54

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* sic - Ed.

TSENTR. KONTROL'NO-SEMENNAYA LAB. MINISTERSTVA SEL'SKOGO KHOZYAISTVA SSSR

(Central Seed Control Laboratory of the Ministry of Agriculture of the USSR)
Moskva, Orlikov p. 1/11; tel. K2-93-36

TSENTR. KONTROL'NO-SEMENNAYA LAB. MINISTERSTVA SEL'SKOGO KHOZYAISTA RSFSR

(Central Seed Control Laboratory of the Ministry of Agriculture of the RSFSR)
Moskva, Pushlinskaya ul. 32; tel. B9-94-04

TSENTR. NAUCHNO-ISSLED.-EKSPERIMENTAL'NAYA LESOKHIMICHESKAYA LAB. (TsNEL)

(Central Scientific Research Experimental Laboratory for Wood Chemistry)
Moskva, Kropotkinskaya nab. 17; tel. G6-70-12

TSENTR. NAUCHNO-ISSLED. LAB. MAKARONNOI PROM-STI (TsNILMAP)

(Central Scientific Research Laboratory for the Marconi Industry)
Moskva, 3-ya Rybinskaya ul. 22; tel. E1-83-21

LAB. METALLOVEDENIYA

(Metal Science Laboratory)
Moskva B, Novodmitrovskaya ul. 28; tel. D1-48-46

TSENTR. LAB. MORSKOGO MODELIZMA (TsMLL)

(Central Laboratory of Ship Modelling)
Moskva, Ulanskii p. 14- tel. B1-79-31

TSENTR. EKSPERIMENTAL'NO-ISSLED. LAB. MOSOTDELSTROYA

(Central Experimental Research Laboratory of the Trust of the Glavmosstroi of the Ispolkom of the Mosgorsovet) *
Moskva, Trekhprudnyi p. 4; tel. K4-25-71

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* Glavmostroi - Main Division for Housing and Civilian Construction in the City of Moscow.
Ispolkom - Executive Committee.
Mosgorsovet - Moscow City Council of Workers' Deputies. - Tr.

TSENTR. LAB. MOSENERGO (TsLEM Mosenergo)

(Central Laboratory of the Mosenergo *)
Moskva, Bolotnaya nab. 15; tel. komm. K0-10-40, dob. 23-19

MUCHNAYA LAB.

(Flour Laboratory)
Moskva, ul. Bogdana Khmel'nitskogo, 4/2; tel. B3-83-59

NAUCHNO-ISSLED. LAB. ORGANIZATSII I PLANIROVANIYA PROIZVODSTVA

(Scientific Research Laboratory for Organization and Planning of Production)
Moskva, Neglinnaya ul. 23; tel. K4-93-65

LAB. OTDELOCHNOI KERAMIKI

(Laboratory for Decorative Ceramics)
Moskva M, Gruzinskaya ul. 15; tel. D2-36-81

TSENTR. NAUCHNO-ISSLED. LAB. PIVOVARENNOI I BEZALKOGOL'NOI PROM-STI (TsNILPP)

(Central Scientific Research Laboratory for the Brewing and Non-alcoholic Industry)
Moskva, Olsuf'evskii p. 6; tel. G6-83-10

MOSK. OBL. LAB. PO IZUCHENIYU BOLEZNEI PCHEL

(Moscow Province Laboratory for the Study of Bee Diseases)
st. Malalhovka M.-Ryazanskoi zh.d., der. Torbeevo +

TSENTR. SPRAVOCHNAYA LAB. TRESTA "STAL'MONTAZH"

(Central Reference Laboratory of the "Stal'montazh"** trust)
Moskva, Ezdokov p. 1; tel. V2-36-86

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* Mosenergo - Moscow Regional Power System Administration. - Tr.

\+ no telephone number given. - Tr.

** State All-Union Trust of the Main Administration for the Building and Installation of Fabricated Steel Structures. - Tr.

LAB. SPELEOLOGII (LS AN SSSR)

(Speleological Laboratory (of the AS USSR))
Moskva, Bryusovskii p. 21; tel. B9-92-03

TSENTR. LAB. SPORTINVENTAR'YA (TsLSI)

(Central Laboratory for Sport Equipment)
Moskva, Trifonovskii tup. 3; tel. I1-99-20

TSENTR. NAUCHNO-ISSLED. STROITEL'NAYA LAB. (TsNILStroimaterialy)

(Central Scientific Research Laboratory for Building Materials)
Moskva, Nov. Basmannaya ul. 23; tel. E1-66-80

TSENTR. NAUCHNO-ISSLED. LAB. PO STROITEL'STVU GLAVMOSOBLSTROYA (MosoblstroiTsNIL)

(Central Scientific Research Laboratory on Building of Glavmosoblstroi *)
Moskva, Ul'yanovskaya ul. 47; tel. Zh1-22-54

TSENTR. NAUCHNO-ISSLED. LAB. PO STROITEL'STVY MINISTERSTVA KHLEBOPRODUKTOV SSSR (TsNIL)

(Central Scientific Research Laboratory on Building of the Ministry of Grain Products of the USSR)
Moskva, Trifonovskaya ul. 47; tel. I4-40-12

TSENTR. LAB. STROIMATERIALOV MINISTERSTVA TRANSPORTNOGO STROITEL'STVA SSSR (TsNIL)

(Central Laboratory on Construction Materials of the Ministry of Transport Construction of the USSR)
Moskva, Pesochnyi p. 3; tel. E1-54-44

TSENTR. NAUCHNO-ISSLED. LAB. STROIMATERIALOV GOS. KOMITETA SOVETA MINISTROV SSSR PO KHIMII (TsNILKhIMStroi)

(Central Scientific Research Laboratory for Construction Materials of the State Chemistry Committee of the Council of Ministers of the USSR)
Moskva, Dushinskaya ul. 17; tel. Zh4-31-03

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* Glavmosoblstroi - Moscow Province Main Construction Office - Tr.

TSENTR. TABACHNO-MAKHOROCHNAYA LAB. (TsTML)

(Central Tobacco and Shag Laboratory)
Moskva, Sofiiskaya nab. 20; tel. V3-49-25

NAUCHNO-ISSLED. LAB. TARY (NILTARA)

(Scientific Research Laboratory for Packaging)
Moskva, pr. Vladimirova 4; tel. B8-64-13

TSENTR. NAUCHNO-ISSLED. LAB. TEKSTIL'NO-GALANTEREINOI PROM-STI (TsNILTGP)

(Central Scientific Research Laboratory of the Textile and Haberdashery Industry)
Moskva, ul. Kirova 47; tel. K2-79-73

TSENTR. LAB. INSPEKTII PO KACHESTVU TEKSTIL'NOGO I KOZHEVENNOGO SYR'YA

(Central Laboratory for Quality Inspection of Textile and Leather Raw Materials)
Moskva, 1-i D'yakovskii p. 4, novoe zdanie (new building), komm. 101; tel. B6-01-02

TSENTR. NAUCHNO-ISSLED. LAB. TEKSTIL'NOI PROM-STI (TsNIL tekstil'noi prom-sti)

(Central Scientific Research Laboratory of the Textile Industry)
Moskva, Krasnoproletarskaya ul. 22; tel. I1-85-61

MEZHOTRASLEVAYA LAB. TEKHNIKO-EKONOMICHESKIKH ISSLEDOVANII I NAUCHNO-TEKHNICHESKOI INFORMATSII

(Inter-industrial Laboratory for Technical and Economic Research and Scientific and Technical Information)
Moskva, ul. Gritsevets 2/16; tel. komm. G6-55-31, dob. 85

FIZIOLOGICHESKAYA LAB.

(Physiological Laboratory)
Moskva, Leninskii prosp. 33; tel. V2-12-86

LAB. FIZIOLOGICHESKOI KHIMII (LAFKHI)

(Physiological Chemistry Laboratory)
Moskva, Pogodinskaya ul. 10; tel. G6-84-65

FIZICHESKAYA LAB.

(Physical Laboratory)
Moskva, Vorob'evskoe shosse 2; tel. V2-32-47

FOTOLABORATORIYA AKADEMII STROITEL'STVA I ARKHITEKTURY SSSR

(Photography Laboratory of the Academy of Building and Architecture of the USSR)
Moskva, Frunzenskaya nab. 30; tel. komm. G5-00-09, dob 16

LAB. NAUCHNO-PRIKLADNOI FOTOGRAFII I KINEMATOGRAFII AKADEMII NAUK SSSR (LAFOKI)

(Laboratory for Scientific Applied Photography and Cinematography of the AS USSR)
Moskva M, Khariton'evskii p. 4; tel. B8-32-30

TSENTR. KHIMIKO-TEKHNOLOGICHESKAYA LAB. TRESTA KHLEBOPEKARNOI PROM-STI

(Central Chemical and Technological Laboratory of the Baking Industry Trust)
Moskva M, Dorogomilovskaya ul. 15; tel. G3-54-65

TSENTR. KHIMICHESKAYA LAB. MINISTERSTVA GEOLOGII I OKHRANY NEDR SSSR (TsKhL)

(Central Chemical Laboratory of the Ministry for Geology and Protection of Resources of the USSR)
Moskva, 1-i Kotel'nicheskii p. 8; tel. K7-47-38

LAB. GOS. KHLEBNOI INSPEKTSII

(Laboratory of the State Bread Inspectorate)
Moskva, ul. Razina 3; tel. B1-46-47

LAB. OBRABOTKI TSVETNYKH FIL'MOV

(Laboratory for the Processing of Colour Films)
Moskva, 1-i Bryanskii p. 11; tel. G3-35-49

TSENTR. CHAINAYA KHIMIKO-ORGANO-LEPTICHESKAYA LAB. (TsKhOL)

(Central Chemical Organoleptic Laboratory for Tea)
Moskva, Borovaya ul. 3. *

* no telephone number given - Tr.

TSENTR. OPYTNO-TEKHNICHESKAYA SHVEINAYA LAB. (TsOTShL)

(Central Experimental Technical Laboratory for Sewing)
Moskva, ul. Gor'kogo 3; tel. B9-52-31

LAB. SHLAKOV I AGLOMERATOV

(Laboratory for Slags and Aggregates)
Moskva, Donskaya pl. 1. *

TSENTR. NAUCHNO-ISSLED. LAB. SHORNOI PROM-STI (TsNILShora)

(Central Scientific Research Laboratory of the Harness Industry)
Moskva, Yakimanskii p. 6; tel. V1-47-21

LAB. EKSPERIMENTAL'NOI FIZIOLOGII PO OZHIVLENIYU ORGANIZMA

(Laboratory for Experimental Physiology of the Resuscitation of the Organism)
Moskva, ul. 25 Oktyabrya 9; tel. B3-80-08

TSENTR. NAUCHNO-ISSLED. LAB. ELEKTRICHESKOI OBRABOTKI MATERIALOV (TsNILElektrom)

(Central Scientific Research Laboratory for Electrical Treatment of Materials)
g. Lyublino Mosk. obl., Shosseinaya ul. 92; tel. Zh7-84-38

LAB. ELEKTROMODELIROVANIYA

(Laboratory for Electrical Analogues)
Moskva, 2-i Bab'egorodkii p. 18; tel. V3-11-86

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* no telephone number given. - Tr.

EDUCATIONAL INSTITUTIONS

Universities

MOSKOVSKII ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI GOS. UNIVERSITET im. M. V. LOMONOSOVA (MGU)

("M. V. Lomonosov" Moscow State University, Order of Lenin and Order of the Red Banner of Labour)
Moskva, Leninskie gory, tel. V9-10-00; Mokhovaya ul. 11, tel. komm. B9-99-14

VECHERNII UNIVERSITET MARKSISMA-LENINISMA

(Evening University of Marxism-Leninism)
Moskva, pr. Vladimirova 4; tel. B3-19-66

Academies

MOSK. VETERINARNAYA AKADEMIYA (MVA)

(Moscow Veterinary Academy)
st. Veshnyaki M.-Ryazanskoi zh.d., pos. Kuz'minki; tel. komm. Zh2-25-77

VSESOYUZNAYA AKADEMIYA VNESHNEI TORGOVLI (VAVT)

(All-Union Academy of Foreign Trade)
Moskva, Babushkin p. 4; tel. E1-58-43

AKADEMIYA OBSHCHESTVENNIKH NAUK PRI TsK KPSS

(Academy of Social Sciences at the Central Committee of the Communist Party of the Soviet Union)
Moskva, Sadovaya-Kudrinskaya ul. 9; tel. komm. D5-00-02

MOSK. ORDENA LENINA SEL'SKOKHOZYAISTVENNAYA AKADEMIYA im. K. A. Timiryazeva (TSKhA)

("K. A. Timiryazev" Moscow Agricultural Academy, Order of Lenin)
Moskva, Novoe shosse 51; tel. I6-13-62 and komm. I6-00-14

Institutes

MOSK. AVIATSIONNYI ORDENA LENINA INSTITUT im. S. ORDZHONIKIDZE (MAI *)

("S. Ordzhonikidze" Moscow Aviation Institute, Order of Lenin)
Moskva Volokolamskoe shosse 18; tel. D8-13-43 and komm. D8-00-02

MOSK. AVIATSIONNYI TEKHNOLOGICHESKII INSTITUT (MATI)

(Moscow Technological Aviation Institute)
Moskva, Strastnoi bul. 14-16; tel. komm. K0-26-40

MOSK. AVTOMEKHANICHESKII INSTITUT (MAMI)

(Moscow Motor Mechanics Institute)
Moskva B, Semenovskaya ul. 38; tel. E1-57-65 and komm. E3-00-48

MOSK. AVTOMOBIL'NO-DOROZHNYI INSTITUT (MADI)

(Moscow Motor Road Institute)
Moskva, Leningradskii prosp. 64a; tel. D7-76-95

MOSK. ARKHITEKTURNYI INSTITUT (MAI *)

(Moscow Architectural Institute)
Moskva, ul. Zhdanova 11; tel. B8-56-76

MOSK. GOS. BIBLIOTECHNYI INSTITUT (MGBI)

(Moscow State Library Institute)
platf. Levoberezhnaya Oktyabr'skoi zh. d.; tel. komm. D3-20-40, dob. 1-85; evening department: Moskva, Sokol'-nicheskii val 30; tel. E1-81-72

INSTITUT VOSTOCHNYKH YAZYKOV

(Institute of Oriental Languages)
Moskva, Mokhovaya ul. 11; tel. komm. B9-99-14, dob. 2-91

MOSK. GEOLOGORAZVEDOCHNYI INSTITUT im. S. ORDZHONIKIDZE (MGPI)

("S. Ordzhonikidze" Moscow Geological Prospecting Institute)
Moskva, Mokhovaya ul. 11 korp. "Zh"; tel. B9-88-81

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* sic. - Ed.

MOSK. GORNYI INSTITUT im. I. V. STALINA (MGI)

("I. V. Stalin" Moscow Mining Institute)
Moskva, Leninskii prosp. 6; tel. V1-32-02 and komm. V1-90-10

MOSK. INSTITUT ZEMLEUSTROISTVA (MIZ)

(Moscow Institute for the Planning of Land Use)
Moskva, ul. Kazakova 15; tel. E1-35-22 and komm. E7-00-07

MOSK. ORDENA TRUDOVOGO KRASNOGO ZNAMENI INZHENERNO-STROITEL'NYI INSTITUT im. V. V. KUIBYSHEVA (MISI)

("V. V. Kuibyshev" Moscow Civil Engineering Institute, Order of the Red Banner of Labour)
Moskva, Spartakovskaya ul. 2; tel. E1-31-02 and komm. E7-00-09

MOSK. INZHENERNO-FIZICHESKII INSTITUT (MIFI)

(Moscow Institute of Engineering and Physics)
Moskva, ul. Kirova 21; tel. B8-41-12

MOSK. INZHENERNO-EKONOMICHESKII INSTITUT im. S. ORDZHONIKIDZE (MIEI im. S. Ordzhonikidze)

("S. Ordzhonikidze" Moscow Institute of Engineering and Economics)
Moskva, Podsosenskii p. 20; tel. K7-50-99 and komm. B7-00-11

MOSK. INSTITUT INZHENEROV VODNOGO KHOZYAISTVA im. V. R. VIL'YAMSA (MIIVKh)

("V. R. Vil'yams" Moscow Institute of Water Engineers)
Moskva, ul. Pryanishnikova 19; tel. komm. I6-00-02, dob, 2-41

MOSK. INSTITUT INZHENEROV GEODESII, AEROFOTOS'EMKI I KARTOGRAFII (MIIGA i K)

(Moscow Institute of Geodetic, Aerial Survey and Cartographic Engineers)
Moskva, Gorokhovskii p. 4; tel. E1-55-69

MOSK. INSTITUT INZHENEROV GORODSKOGO STROITEL'STVA (MIIGS)

(Moscow Institute of Urban Civil Engineers)
Moskva, Shlyuzovaya nab. 8; tel. V1-56-63 and komm. V3-00-49

MOSK. ORDENA LENINA I ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT INZHENEROV ZHELEZNODOROZHNOGO TRANSPORTA (MIIT)

(Moscow Institute of Railway Transport Engineers, Order of Lenin and Order of the Red Banner of Labour)
Moskva, ul. Obraztsova 15; tel. I1-71-03 and komm. I4-01-00

1-i MOSK. GOS. PEDAGOGICHESKII INSTITUT INOSTRANNYKH YAZYKOV (MPGPIIYa)

(First Moscow State Pedagogic Institute for Foreign Languages)
Moskva, Metrostroevskaya ul. 38; tel. G6-84-46

MOSK. GOS. ISTORIKO-ARKHIVNYI INSTITUT (MGIAI)

(Moscow State Institute for History and Archives)
Moskva, ul. 25 Oktyabrya 15; tel. K5-42-68

VSES. GOS. INSTITUT KINEMATOGRAFII (VGIK)

(All-Union State Institute of Cinematography)
Moskva, 3-i Sel'skokhozyaistvennyi pr. 3; tel. komm. I1-30-00, dob. 3041

MOSK. LESOTEKHNICHESKII INSTITUT (MLTI)

(Moscow Institute for (Forest) Wood Technology)
platf. Stroitel' Severnoi zh. d., tel. komm. I4-61-31

MOSK. LITERATURNYI INSTITUT im. A. M. GOR'KOGO (LITIN-T)

("A. M. Gor'kii" Moscow Literary Institute)
Moskva, Tverskoi bul. 25; tel. B1-99-83

MOSK. VECHERNII MASHINOSTROITEL'NYI INSTITUT (MVMI)

(Moscow Evening Institute of Mechanical Engineering)
Moskva, Shabolovka 24a; tel. V1-43-49

1-i MOSK. ORDENA LENINA MEDITSINSKII INSTITUT im. I. M. SECHENOVA (MOLMI)

("I. M. Sechenov" First Moscow Institute of Medicine, Order of Lenin)
Moskva B, Pirogovskaya ul. 2/6; tel. komm. G6-05-20, dob. 1-86

2-i MOSK. GOS. MEDITSINSKII INSTITUT im. N. I. PIROGOVA (2-i MGMI)

("N. I. Pirogov" Second Moscow State Institute of Medicine)
Moskva M, Pirogovskaya ul. 1; tel. komm. G6-50-20, dob. 14

MOSK. VECHERNII METALLURGICHESKII INSTITUT (MVMI)

(Moscow Evening Institute of Metallurgy)
Moskva, 2-i Prolomnyi pr. 1; tel. Zh4-38-28

MOSK. INSTITUT MEKHANIZATSII I ELEKTRIFIKATSII SEL'SKOGO KHOZYAISTVA (MIMESKh)

(Moscow Institute for the Mechanization and Electrification of Agriculture)
Moskva, Novoe shosse 46; korp. 15; tel. I6-02-64

GOS. MUZYKAL'NO PEDAGOGICHESKII INSTITUT im. GNESINYKH

("Gnesinykh" State Institute for Music Teacher Training)
Moskva, ul. Vorovskogo 30/36; tel. B8-89-73 and komm. K4-15-28

MOSK. INSTITUT NARODNOGO KHOZYAISTVA im. G. V. PLEKHANOVA (INKh im. G. V. Plekhanova)

("G. V. Plekhanov" Moscow Institute for National Economy)
Moskva, Stremyannyi p. 28; tel. V1-41-42 and komm. V3-00-31

MOSK. ORDENA TRUDOVOGO KRASNOGO ZNAMENI NEFTYANOI INSTITUT im. Akad. I. M. GUBKINA (MNI)

("Academician I. M. Gubkin" Moscow Oil (petroleum) Institute, Order of the Red Banner of Labour)
Moskva, Leninskii prosp. 6; tel. V1-11-87 and komm. V1-85-10

MOSK. GOS. PEDAGOGICHESKII INSTITUT im. V. I. LENINA (MGPI im. V. I. Lenina)

("V. I. Lenin" Moscow State Pedagogic Institute)
Moskva M, Pirogovskaya ul. 1; tel. G6-82-73

MOSK. GOR. PEDAGOGICHESKII INSTITUT im. V. P. POTEMKINA (MGPI im. V. P. Potemkina)

("V. P. Potemkin" Moscow City Pedagogic Institute)
Moskva, Davydovskii p. 4; tel. E1-89-93

MOSK. OBL. PEDAGOGICHESKII INSTITUT im. N. K. KRUPSKOI (MOPI)

("N. K. Krupskaya" Moscow Province Pedagogic Institute)
Moskva, ul. Radno 10a; tel. E1-85-70

MOSK. VYSSHII PEDAGOGICHESKII INSTITUT TSENTROSOYUZA (VPI)

(Moscow Higher Pedagogic Institute of Tsentrosoyuz *)
st. Perlovskaya Severnoi zh. d., 2-ya Vokzal'naya ul. 12;
tel. komm. I1-00-10, dob. 2-57

MOSK. POLIGRAFICHESKII INSTITUT (MPI)

(Moscow Institute of Printing)
Moskva, Sadovaya-Spasskaya ul. 6; tel. B1-55-67

MOSK. ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT STALI im. I. V. STALINA

("I. V. Stalin" Moscow Institute of Steel, Order of the Red Banner of Labour)
Moskva, Leninskii prosp. 6; tel. V1-60-82

MOSK. STANKO-INSTRUMENTAL'NYI INSTITUT im. I. V. STALINA (STANKIN)

("I. V. Stalin" Moscow Institute of Machines and Tools)
Moskva, Vadkovskii p. 3a; tel. D1-88-64 and komm. D3-15-53

MOSK. MEDITSINSKII STOMATOLOGICHESKII INSTITUT (MMSI)

(Moscow Medical Institute of Stomatology)
Moskva, Kal'yaevskaya ul. 18; tel. D1-01-07

MOSK. GOS. INSTITUT TEATRAL'NOGO ISSKUSTVA im. A. V. LUNACHARSKOGO (GITIS)

("A. V. Lunacharskii" Moscow State Institute of Theatrical Art)
Moskva, Sobinovskii p. 4; tel. B3-90-71

MOSK. TEKSTIL'NYI INSTITUT (MTI)

(Moscow Textile Institute)
Moskva, Donskaya ul. 62; tel. V2-16-45 and komm. V2-05-00

*Central Union of Consumers' Co-operatives - Tr.

MOSK. TEKHNICHESKII INSTITUT RYBNOI PROM-STI I KHOZYAISTVA im. A. I. MIKOYANA (MOSRYBVTUZ)

("A. I. Mikoyan" Moscow Technical Institute of the Fish Industry and Fisheries)
Moskva, ul. Pryanishnikova 2a; tel. I6-I4-70

MOSK. TEKHNOLOGICHESKII INSTITUT LEGKOI PROM-STI (MTILP)

(Moscow Technological Institute for the Light Industry)
Moskva, ul. Osipenko 33; tel. V1-92-38

MOSK. TEKHNOLOGICHESKII INSTITUT MYASNOI I MOLOCHNOI PROM-STI

(Moscow Technological Institute of the Meat and Dairy Industry)
Moskva, ul. Talalikhina 33; tel. Zh 1-35-80

MOSK. TEKHNOLOGICHESKII INSTITUT PISHCHEVOI PROM-STI (MTIPP)

(Moscow Technological Institute of the Food Industry)
Moskva, Volokolamskoe shosse 11; tel. D8-11-71 and komm. D8-00-06

MOSK. INSTITUT TONKOI KHIMICHESKOI TEKHNOLOGII im. M. V. LOMONOSOVA (MITKhT)

("M. V. Lomonosov" Moscow Institute of Fine Chemical Technology)
Moskva M, Pirogovskaya ul. 1; tel. G6-84-66

MOSK. TORFYANOI INSTITUT (MTI)

(Moscow Peat Institute)
Moskva B, Vuzovskii p. 3/12; tel. K7-59-33

MOSK. TRANSPORTNO-EKONOMICHESKII INSTITUT (MTEI)

(Moscow Institute of Transport Economics)
Moskva, Ambulatornyi p. 19; tel. D7-29-03

MOSK. FARMATSEVTICHESKII INSTITUT (MFI)

(Moscow Pharmaceutical Institute)
Moskva, Suvorovskii bul. 13; tel. K4-12-50

MOSK. FIZIKO-TEKHNICHESKII INSTITUT (MFTI)

(Moscow Institute of Physics and Technology)
st. Dolgoprudnaya Severnoi Zh.d., Savelovskii vokzal;
tel. I6-12-94 and komm. I6-00-05

GOS. TSENTR. ORDENA LENINA INSTITUT FIZICHESKOI KUL'TURY im. I. V. STALINA (GTsOLIFK)

("I. V. Stalin" State Central Institute of Physical Culture, Order of Lenin)
Moskva, ul. Kazakova 18; tel. E1-89-88

MOSK. FINANSOVYI INSTITUT (MFI)

(Moscow Finance Institute)
Moskva, 1-ya Yaroslavskaya ul. 3; tel. I1-06-80

MOSK. ORDENA LENINA KHIMIKO-TEKHNOLOGICHESKII INSTITUT im. D. I. MENDELEEVA (MKhTI)

(D. I. Mendeleev" Moscow Institute of Chemical Technology, Order of Lenin)
Moskva, Miusskaya pl. 5/3; tel. D1-12-28 and komm. D0-00-06

MOSK. INSTITUT KHIMICHESKOGO MASHINOSTROENIYA (MIKhM)

(Moscow Institute of Chemical Machinery)
Moskva, ul. Karla Marksa 21/4; tel. E1-61-81 and komm. E7-00-06

MOSK. GOS. KHUDOZHESTVENNYI INSTITUT im. V. I. SURIKOVA (MGKhI im. SURIKOVA)

("V. I. Surikov" Moscow State Art Institute)
Moskva, Tovarishcheskii p. 30; tel. Zh2-17-23

MOSK. INSTITUT TSVETNYKH METALLOV I ZOLOTA im. M. I. KALININA (Mintsvetmetzoloto)

("M. I. Kalinin" Moscow Institute of Non-ferrous Metals and Gold)
Moskva, Krymskii val 3; tel. V3-48-18

MOSK. EKONOMIKO-STATISTICHESKII INSTITUT (MESI)

(Moscow Institute of Economics and Statistics)
Moskva B, Savvinskii p. 14; tel. G6-26-64

MOSK. GOS. EKONOMICHESKII INSTITUT (MGEI)

(Moscow State Institute of Economics)
Moskva, Zatsepa 41; tel. V1-99-02

MOSK. ELEKTROTEKHNICHESKII INSTITUT SVYAZI (MEIS)

(Moscow Electrotechnical Institute of Communications)
Moskva, Aviamotornaya ul. 8a; tel. Zh4-27-83

MOSK. ORDENA LENINA ENERGETICHESKII INSTITUT (MEI)

(Moscow Institute of Power, Order of Lenin)
Moskva, Krasnokazarmennaya ul. 14; tel. Zh3-59-61

BRITISH EMBASSY

Moskva 12, Sofiiskaya naberezhnaya 14; 31-95-55

Abbreviations used:

AS USSR	Academy of Sciences of the USSR
bul. (bul'var)	boulevard
der. (derevo)	village
dob. (dobavochnyi)	extension (telephone)
g. (gorod)	town, city
gos. (gosudarstvennyi)	state
inst.	institute
issled. (issledovatel'skii)	research
komm. (kommutator)	switchboard (telephone)
komm. (komnata)	room
korp. (korpus)	building
lab. (laboratoriya)	laboratory
Mosk. obl. (Moskovskaya oblast')	Moscow province
nab. (naberezhnaya)	embankment
p. (pereulok)	lane
pl. (ploshchad')	square
pochtovoe otd. (otdelenie)	postal district
pom. (pomeshchenie)	premises
pos. (posad)	settlement, suburb
pr., prosp. (prospekt)	avenue
prom-st' (promyshlennost')	industry
st. (stantsiya)	station
tsentr. (tsentral'nyi)	central
tup. (tupik)	cul-de-sac
ul. (ulitsa)	street
vses. (vsesoyuznyi)	all-union
zh.d. (zheleznaya doroga)	railway line

IMPROVE THE PROPAGATION OF TECHNICAL LITERATURE

*E. Morozova

+Bibliotekar', 1960 (10) 5-7

The July Plenary Session of the Central Committee of the CPSU strongly emphasized the decisive importance of new methods and up-to-date technology for technical progress, increased industrial production, and the development of building and transport.

Technical literature is a powerful means of propaganda for up-to-date methods of work. The most important task of all libraries is to open up wide access to the riches of their book-stocks, to put technical books into the hands of every worker in industry, building and transport, of everyone engaged in mechanizing agriculture.

The CC of the CPSU resolution on library affairs requires us to concentrate the publicizing of technical literature on the urgent problems of the factories, mills and building sites.

This task can be achieved by the combined efforts of all types of libraries. Although public, scientific, technical and trade union libraries have different book stocks, different kinds of readers,

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*Director, GPNTB SSSR (State Public Scientific Technical Library of the USSR)

+LLU shelf mark: R0017. Holding: 1951 (1) - 1954 (12), 1956 (1) -

different methods of operating, they all try to work together actively towards the introduction of the latest scientific and technological achievements.

Among the libraries collaborating to help production, technical libraries have a special place. To keep their activity in close touch with life, their administrative structure corresponds to that of industry.

At the head of this structure stands the Gosudarstvennaya publichnaya nauchno-tekhnicheskaya biblioteka SSSR (GPNTB SSSR) supported by branches, central departmental scientific and technical libraries of ministries and committees, and central scientific and technical libraries of Soviet republics and economic regions.

A great part of the technical libraries is made up of the libraries of industrial concerns, and of the scientific research and planning institutes of industry, building and transport. Unfortunately many of them are still very weak and require day-to-day assistance not only from the scientific and technical libraries of sovnarkhozy* and state scientific and technical committees of Soviet republics, but also from the GPNTB. Methodical help is given to technical libraries by those of provinces, territories and republics.

The bibliographic and methodical manuals of the GPNTB have an important function. We have examined the 1960-61 publishing programme for these manuals, so as to devote them completely to the problems of to-day. Our publications are aimed at the staffs not only of technical special libraries and technical information departments, but of general public libraries too. We attach special importance to lists of recommended reading for engineers, technicians and workers.

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*Councils of National Economy

From 1960 the GPNTB will issue two series of reading lists. One of them, "Literatura v pomoshch rabochim skvoznykh professii" (Literature to Help Team Workers), will include surveys of literature on production technology and technological economics, recommended for grinders, markers, polishers, and workers of other trades. The other series, "Rabochemu o novoi tekhnike" (For the Worker About New Techniques), will contain surveys of popular and elementary scientific works and literature on production technology and technological economics, applied to the current problems of technical progress referred to in the CC of the CPSU Plenary Session last July. Eight bibliographies in this series are to come out in 1960-61.

As new literature appears on the same subjects, we shall send out bibliographical leaflets giving details of further books and articles, to supplement the original reading lists.

The GPNTB is preparing a number of methodical guides for librarians who are promoting (the use of) technical books. They include among others a series of educational letters on basic library organization, techniques for technical librarians, monthly bulletins on new experience in handling technical literature, and a "sbornik" (collection of articles) entitled "Tekhnicheskie biblioteki SSSR" (Technical libraries of the USSR)

Central scientific and technical libraries of economic regions and Soviet republics are called upon to provide industrial libraries with direct methodical help. For this they run formal professional associations for the staff of the works libraries of the economic region. One should stress that the success of these associations greatly depends on those colleagues from province and territory libraries who take part in their work.

Works technical libraries, organically connected with production, publicize production literature where it will be useful, respond keenly to the demand from the shop floor, the laboratory, and other sections, and help industrial undertakings in their efforts to adopt new methods and progressive technology.

As a shining example one might take the NTB (Scientific and Technical Library) of the Izhorsk Works. This library has carried out an interesting experiment on popularizing literature on problems connected with production. When new methods are introduced or technological processes are being changed, the librarians select relevant literature for exhibitions and displays, and inform the workshop collectives about it.

The initiative of I. V. Yashin, an engineer at the Izhorsk Works, is well known: he has organized small technical literature study circles, where workers of any one trade meet under the leadership of engineers. The librarians carefully follow up the requests of the members and leaders of these circles and provide them with literature.

The experiment of the Izhorsk works library has been repeated in factories in many towns in this country. Everywhere that technical literature study circles have been formed, the works libraries take the most immediate interest in their organization.

In the technical library of the Minsk Automobile Works the closest links have been created with production. With the aim of attracting the whole collective of the undertaking to reading technical and technical-economic literature, the library devotes especial attention to planners and inventors, young workers contending for the high title of brigades of communist labour. It gives wide publicity to the latest experience of innovators and

planners of production, organizing exhibitions and designing bibliographical posters. Twelve mobile libraries of technical literature have been organized in the shops and laboratories of the works.

The librarians are often in the workshops, finding out from shop managers and laboratory chiefs what difficulties they are up against, what literature ought to be put on the mobile libraries. The members of the librarians' association improve their qualifications in a special seminar. All this has given good results. Although the library has a staff of only two, with the help of activists they serve as many as 3000 readers.

In our industry, in which mechanization and automation of production are being widely introduced, the teams of technicians are specializing more and more, new professions are appearing, the general cultural and technical level of the workers is rising. This, of course, is reflected in the composition of the readership of the technical libraries, and demands of them more up-to-date propaganda methods for technical books, such as open access to book stocks, subject surveys of literature, information days, readers' conferences, reviews of new publications contributed by specialist readers, and so on.

Unfortunately, these methods have not yet been widely adopted. Open access in technical libraries is being introduced hesitantly. But in those which want to do this, the necessary conditions often do not exist: they should confine themselves to partial access.

Subject exhibitions providing surveys of the literature have become part of technical library practice. Especially interesting is the experiment of the TsNTB (Central Scientific and Technical Library) of the Khar'kov Sovnarkhoz, where in the workshops and

laboratories, they organize displays of new books, based on the enquiries from within the organization, on such subjects as programming the control of machine tools, the campaign against waste in foundry practice, or turbine construction. In the NTB (Scientific and Technical Library) of the Khar'kov Tractor Works, surveys of literature on the various trades have been used with particular success among the readers. In planning the subjects, choice and arrangement of literature for the displays, the chief engineers and chief technicians take an active part, and so do the staff of the office of technical information.

In many libraries the co-operation between biographers and the staff of technical information departments is getting stronger. This has a beneficial effect on the quality of bibliographic and information work. As an example of this, the libraries of Zlatoust Steelworks, the "Krasnyi Oktyabr'" Works at Stalingrad and many others organize, with the help of engineers, topical surveys of the literature on their particular production problems.

Information days have become widespread. This is a new form of participation by activist readers in bibliographic work. On a certain day the information men - representing workshops, sections, laboratories - visit the library to examine the new literature and then tell their collectives about it, mentioning especially anything that can be applied in production.

Many sovnarkhozy, to improve the position of the libraries in their economic region in the campaign to introduce new techniques, have held inspections of their work. During the inspection of the libraries of Leningrad, for example, remarkable successes were achieved in popularizing technical literature among workers,

engineers and technicians. The number of readers was increased and the work of library councils was revitalized.

Good results were also obtained from an inspection of the libraries of Moscow province Sovnarkhoz. The NTB (Scientific and Technical Library) of Elektrostal' Heavy Machinery Works, for example, increased its readership by 61% as against the previous year; the library of Kuskovsk Chemical Factory serves 70% of the workers in the undertaking: the library of the "M. I. Kalinin" Engineering Works at Podol'sk has provided a number of new mobile libraries in the workshops, bringing the total to 16, and held several readers' conferences.

Remarkable results have been achieved by the technical libraries of the Chelyabinsk economic region. In 18 technical libraries of the province, open access to the book stock has been provided. In 61 libraries out of 98 mobile libraries have been opened in the workshops and sections of factories. During the period under review their number was doubled. Engineer readers take an active part in the work of the mobile libraries.

From inspections conducted by individual sovnarkhozy we pass on to an All-Union one.

The Sovet po bibliotechnym voprosam (Council on Library Problems) of the USSR Ministry of Culture has decided, in accordance with the declaration of the July Plenary Session of the CC of the CPSU, to arrange a review of the work of all kinds of library engaged in the dissemination of technical literature. This review will unite all libraries in their efforts to help those who are working to fulfil the seven-year plan ahead of schedule; it will facilitate the exchange of experience on the dissemination of technical knowledge in libraries.

The review will contribute towards the successful realization of the resolution of the July Plenary Session of the CC of the CPSU, which set libraries the task of actively furthering literature on new techniques and progressive technology, and on production economics.

By improving the structure and methods of propaganda of technical and technical-economic literature, librarians are bringing a worthy contribution to the struggle to speed up technical progress, towards raising standards of quality in industry and transport, towards fulfilling the seven-year plan ahead of schedule.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received at the D.S.I.R. Lending Library Unit, 20, Chester Terrace, London, N.W.1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar reports they may have made in the Lending Library Unit.

LIBRARIES

MAYNARD, G. L.: "A Tour of Russian Libraries". Report UCRL-5963, University of California, Lawrence Radiation Laboratory, Livermore, California, 7th April 1960.

(Report on visit in August 1959 to the USSR. Libraries visited included the Saltikov-Shchedrin State Public Library and the Library of the Academy of Sciences of the USSR in Leningrad, and the Lenin State Public Library, Moscow University Library, All-Union Library for Foreign Literature and the All-Union Institute of Scientific Information of the Academy of Sciences of the USSR (VINITI) in Moscow.)

LLU shelf mark: V 88

EDUCATION

NOLAN, T.: "Polytechnical Education in the USSR", Research applied in industry, 1960 13 (5) 198-200

(A brief report based on a 3-month visit in 1958 to Moscow, Kiev and Odessa.)
LLU shelf mark: V 89

CHEMISTRY

WINKLER, C.: "Diary of Visit to USSR". Unpublished report by author.
(Report on visit in September 1960. Institutions visited included the Institute of Chemical Kinetics, and the Mendeleev Institute in Moscow, and the Leningrad Institute of High Molecular Chemistry.)
LLU shelf mark: V 90

GENETICS

BOYES, J. W.: "Genetics in the Soviet Union". Unpublished report of lecture to the Genetics Society of America, 30th August 1960 by author, Department of Genetics, McGill University.
(Report on visit in 1960. Institutions visited included in Leningrad: the Department of Genetics of the State University of Leningrad, the Institute of Plant Industry, the Botanical Institute of the Academy of Sciences; in Moscow: the Department of Genetics, Microbiology, Higher Plants, Biochemistry and Darwinism of the University of Moscow, the Genetics Institute of the Academy of Sciences of the USSR, the Department of Classical Genetics of the Institute of Biophysics of the Academy of Sciences of the USSR, the Institute of Animal Industry, the Botanical Institute, the All-Union Zonal Laboratory, the Institute of Experimental

Biology of the Academy of Medical Sciences of the USSR, and the Gorky Experimental Farm near Moscow; in Kiev: the Botanical Institute, the Ukrainian Institute of Agricultural Science, the Ukrainian Scientific Institute of Horticulture, the Departments of Physiology and Biochemistry and Biology and Darwinism of the University of Kiev, and the All-Union Institute of Sugar Industry; in Kharkov the Ukrainian Institute of Plant Breeding and Genetics; in Odessa: the All-Union Institute of Genetics and Plant Breeding; in Yalta: the Nikitsky Botanical Garden; in Sochi: Dendrary; in Sukhumi: the Experimental Biological Research Institute; in Batum: the Botanical Institute and the Tea Research Institute; in Tbilisi: the Department of Genetics and Cytology of the Botanical Institute of Tbilisi, the Department of Genetics of the Georgian University of Tbilisi, and the Department of Plant Breeding of the Georgian University of Tbilisi; in Erevan: the Institute of Grape Industry, Wine and Horticulture, the Armenian Agricultural Institute and the Biological Department of the Erevan State University. Few details of work in progress at particular institutes are given, only the more important achievements being described in this report.)

LLU shelf mark: V 91

---: "Interview with Professor J. Wallace Boyes, Chairman of the Department of Genetics, McGill University". Text of CBC International Service broadcast, Montreal, 23rd September 1960.

(Some further details on visit noted above (V 91) are given.)

LLU shelf mark: V 92

AUTOMATION

HAM, J. M.: "Report to the NRC on Visit to Soviet Union May 16 to July 2, 1960". Unpublished report by author at University of Toronto, Toronto, Canada.
(Institutes visited included the Institute of Automatics and Telemechanics of the Academy of Sciences of the USSR in Moscow, the Moscow Power Institute of the Gosplan SSSR, the Moscow Energetics Institute (engineering school), Moscow University; in Leningrad: the Institute of Electromechanics of the Academy of Sciences of the USSR, the Polytechnic Institute (engineering school), the Pulkovo Astronomical Observatory, the Institute of Electrotechnics (engineering school); in Kiev: the Institute of Electromechanics of the Ukrainian Academy of Sciences, the Institute of Automatics of the Gosplan of the Ukrainian SSR; the Crimean Astrophysical Observatory of the Academy of Sciences of the USSR; the IFAC Congress in Moscow.)
LLU shelf mark: V 93

STEINER, L. A.: "The IFAC Congress in Moscow", Automation and Automatic Equipment News, September 1960, pp. 12-16.
(Brief report on visit.)
LLU shelf mark: V 97

MINING

RICE, H. R.: "Exchange Visit to the USSR, May - June 1960". Unpublished report by author, Department of Mining Engineering, University of Toronto, Toronto, Canada.

(Institutions visited include in Moscow: the Academy of Sciences of the USSR, University of Moscow, the Institute of Mining; in Leningrad: the Leningrad Mining (teaching) Institute, the Leningrad All-Union Surveying Institute, the Mining Institute; in Kiev: the Ukrainian Academy of Sciences,; in Krivoi Rog: the Krivoi Rog Mining (teaching Institute), the "Giant" section of the "Dzerzhinsky" Mine, the Krivoi Rog Mining and Treating Combine (open-pit iron mine), and the Leninruda Trust "20th Congress" Mine (underground).)
LLU shelf mark: V 94

INDUSTRIAL MANAGEMENT

HERMAN, L. M.: "What You'd be Doing in Russia", Nation's Business, December 1960, pp. 40-41..96.
(With subtitle: "Think you have problems ? Take a look at those of industrial managers in USSR". A report based on interviews with economists and industrial plant managers in the course of a visit in summer 1960 to six USSR industrial centres.)
LLU shelf mark: V 95

DAVID, D. K. et al.: "Inside the Soviet Economy", Saturday Review, 21st January 1961, pp. 21-42.
(Report on visit to the USSR in summer 1960 by a 6-man Committee for Economic Development team. The separate articles are: "Planning: Backbone of a Nation" (G. Grossman), "The Rise of Technology" (H. Stein), "Industry's Problems and Prospects" (G. Terbough), "The USSR's Organization Men"

(F. A. Bond), "The Labor Force: Who Does What" (L. Herman) and "Human Capital: A Growing Asset" (T. W. Schultz). "Storm Signals for the West" was written by H. Heyman who visited the USSR earlier with a group of air transport specialists. Plants visited included a lathe plant and a watch factory in Moscow, a confectionery factory and a turbogenerator plant in Leningrad, an automatic lathe plant in Kiev, a tractor plant, building tile plant, and a hosiery factory in Kharkov, and a steel works in Rustavi. In addition the Institutes of Economics of the Academies of Sciences of the USSR, Ukrainian SSR, Georgian SSR, and Uzbek SSR and the Chief Administration of Local Industry under the Leningrad city government were visited. The articles are concerned mainly with industrial management problems.)

LLU shelf mark: V 96

BUILDING

FLIER, G, van der: "Enkele Russische reisindrukken", Bouw, 5th December 1959, pp. 1390-1396.

(Report on visit in 1959 to Kiev, Leningrad and Moscow. A pre-stressed concrete plant was visited in Moscow, as well as housing development sites.)

LLU shelf mark: V 98

Report V 49 by D. Barlow, noted in LLU Translations Bulletin, December 1960, p. 1059 has been withdrawn at the request of the publishers.

The report by I. S. Duncan, noted in NLL Translations Bulletin, January 1961 p. 38, is report V 64.

L. L. U. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. Centre, L. L. U. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to 20, Chester Terrace, London, N. W. 1., and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from D. S. I. R., should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

535 OPTICS. LIGHT

BORIN, A. V. & POBEDONOSTSEVA, I. A.
M. 2494. Spectrophotometric investigation of dye solutions forming H-aggregates.
Zh. nauchn. prikl. fotogr. kinematogr.
1958 3 (4) 256-266

KOROLEV, F. A. & KLEMENTEVA, A. Yu.
M. 2534. Methods of preparing dielectric mirrors and interference light filters, and a study of their optical properties.
Vestn. Mosk. un-ta 1957 (3) 65-73

KRAMELEI, E. P.
M. 2508. Structure of the absorption spectrum of the colloidal silver solution.
Zh. nauchn. prikl. fotogr. kinematogr.
1958 3 (3) 161-165

SHIROKSHINA, Z. V. & SUIKOVSKAYA N. V.
M. 2516. Preparation of infra-red transmitting films.
Optika i spekt. 1958 4 (1) 82-86

539 PHYSICAL NATURE OF MATTER

BRILLIANTOV, N. A. & OBREIMOV, I. V.
M. 2631. On plastic deformation (of rocksalt).
Zh. eksp. teor. fiz. 1937 7 (8) 978-985

GOLDENVEIZER, A. L.
M. 2384. On Reissner's theory of the bending of plates.
Izv. AN SSSR, Otd. tekh. n. 1958, (4)

KRASOVSKIY, V. I. et al.
M. 2607. Discovery of electrons with an energy of about 10kev in the upper atmosphere with the aid of the third earth satellite.
Dokl. AN SSSR 1959 127(1) 78-81

UMANSKII, Ya. S., & PIVOVAROV, L. Kh.
M. 2509. X-ray diffraction methods for investigation of the mosaic structure of metal.
Zavodsk. laboratoriya 1958 24 (5) 549-554

541 GENERAL, THEORETICAL AND PHYSICAL CHEMISTRY

BOGOYAVLENSKAYA, L. & KOVALSKII, A. A.
M. 2602. Concerning the initiation of homogeneous gas reaction by solid catalysis.
Zh. fiz. khim. 1946 20 (2) 1325

PLAKSIN, I. N.
M. 2667. The gold-mercury system.
Izv. AN SSSR, Sekt. fiz. khim. analiz.. 1936 10 129-159

SELINOV, I. P.
M. 2668. D. I. Mendeleyev's periodic system of elements and certain problems of atomic physics.
Uspekhi fiz. n. 1951 44 (4) 511-526

VASILEV, D. F.
M. 2633. On the mechanism of the reaction of the formation of aluminium naphthenate.
Kolloid zh. 1949 11 (6) 377-383

543/545 ANALYTICAL CHEMISTRY

BABKO, A. K.
M. 2565. Development of analytical chemistry in the USSR.
Zavodsk. laboratoriya 1957 23 (10) 1153-1161

GORYUSHINA, V. G. & BIRYUKOVA-GAILIS, E. Ya.
M. 1779. The colorimetric determination of small quantities of phosphorus in the presence of large amounts of vanadium.
Zavodsk. laboratoriya 1958 24 (4) 402-403

PROKOVEV, V. K.
M. 2556. Emission spectrographic analysis in the USSR
Zavodsk. laboratoriya 1957 23 (10) 1187-1201

VESELOV, V. V.
M. 2327. Conical chromatographic columns
Khimiya i tekhnol. topliva i masel 1958 (7) 66-70

ZIMAKOV, I. E. & ROZHAVSKII, G. S.
M. 2482. Multiple radioactive dilution method for determining minor impurities.
Zavodsk. laboratoriya 1958 24 (8) 922-925

547 ORGANIC CHEMISTRY

NATANSON, S. V.
M. 2444. Absorption and sensitization spectra of 5,5'-dihalogen-substituted thiacarbocyanines.
Dokl. AN SSSR 1956 106 (3) 497-500

RAFIKOV, S. R. et al.
M. 2675. Relationship between the properties of solution and polymer structure.
III: The application of precision ebullioscopy in molecular weight determination of polyalumino-organosiloxanes.
Vysokomolekul. soedineniya 1959 1 (3) 400-403

TAGER, A. A. et al.
M. 2461. The effect of annealing on molecular packing in polystyrene.
Dokl. AN SSSR 1959 124 (1) 133-134

VAISMAN, S. B.
M. 2621. Seven-membered heterocyclic compounds, products of the reaction of O-phenylene-diamine with derivatives of acetyl acetone.
Tr. in-ta khim. Kharkov un-ta. 1938 4 (13) 157-174

ZIGACH, K. F. & FINKELSTEIN, M. E. et al.
M. 2419. Preparation and study of the physical-chemical properties and fractions of carboxy-methyl cellulose.
Dokl. AN SSSR 1958 123 (2) 289-291

57/59 BIOLOGY

MOISEEV, P. A.
M. 2655. New data on the effect of thermonuclear explosions on aquatic organisms.
Rybn. kh-vo 1958 (1) 22-24

ODINTSEV, P. N.
M. 2594. Present day views on the structure of cellulose and cell walls of plants.
Tr. AN LatvSSR 1957 12 5-24

POLIKARPOV, G. G.
M. 2654. Accumulation of the radio-isotype of cerium by fresh-water molluscs.
Priroda 1958 (5) 86-87

621.3 ELECTRICAL ENGINEERING

KOVAL, I. I. & VOROBEVA, V. N.
RAE 908. The use of oxides of manganese in alkaline batteries.
Vestn. elektroprom-sti 1958 (6) 46-48

KOVAL, I. I. & VOROBEVA, V. N.
RAE 910. The use of manganese in alkaline batteries
Vestn. elektroprom-sti 1958 (4) 47-49

KUROCHKA, A. L. & BABIN, A. S.
M. 2663. Electrical systems of the VL23 electric locomotive with regeneration.
Elektr. i teplov. tyaga 1959 (3) 29-31

ZHILIN, V. G. & NEKRASOV, A. M.
M. 2658. Standard plans for the thermal power stations to be constructed during the period 1959-1965.
Elektr. stantsii 1960 (6) 8-24

ZVEZDKIN, V. I. et al.
M. 2659. Effect of dielectric properties of transformer oil on the electric strength of transformer insulation.
Elektr. stantsii 1960 (4) 60-64

ALEKSANDROV, M. S.
M. 2688. Signal detection. (b) Distribution of phase differences of oscillations in the combination of a fluctuating signal, noise and correlated interference.
Radiotekhnika i elektronika 1960 (3) 360-365

BASHARINOV, A. Ye.
M. 2688. Signal detection (a) Detection of pulse packets of random length by devices with finite memory capacity under the action of fluctuation interference.
Radiotekhnika i elektronika 1960 (3) 355-359

CHAYKOVSKIY, V. I.
M. 2683. Freedom from interference of the integral autocorrelation method of reception.
Izv. vyss. ucheb. zaved. radiotekhn.
1958 (5) 551-554

CHERNYAK, Yu. B.
M. 2688. Signal detection: (c) Detection of a signal of unknown frequency and arbitrary initial phase on a background of white noise.
Radiotekhnika i elektronika 1960 (3) 366-375

CHERNYAK, Yu. B.
M. 2678. Mutual correlation of noise voltages at output of amplifiers with intersecting frequency characteristics.
Radiotekhnika i elektronika 1960 (4) 551-561

DOBRUSHIN, E. L.
M. 2689. Optimum transmission of information by a telecommunications channel with unknown parameters.
Radiotekhnika i elektronika 1959 4 (12) 1951-1956

OSIPENKO, G. U.
M. 2600. A new automatic tape operated telegraph apparatus, the LTA-57.
Vestn. svyazi 1960 (4) 11-13

TEPLYAKOV, I. M.
M. 2693. One method of calculating the correlation function at the output of a non-linear system.
Radiotekhnika 1960 15 (1) 35-37

TETEL'BAUM, S. I.
M. 2458. A phasochronic backward wave generator.
Radiotekhnika i elektronika 1957 (6) 705-713

621.7 WORKSHOP PRACTICE GENERALLY

CHAIKOVSKII, K. A.
M. 2350. An initial shaking out frame.
Liteinoe proiz-vo 1959 (12) 13-14

DRUGALEV, S. M.
M. 2343. Problems of the reorganization of the foundry industry in the Sverdlovsk national industrial council.
Liteinoe proiz-vo 1959 (12) 4-5

IVANOV, D. P.
M. 2340. XXVI International Foundry Congress.
Liteinoe proiz-vo 1959 (12) 1-2

KHAMIDOV, P. K.
M. 2363. One piece coreboxes for making tall cylindrical cores.
Liteinoe proiz-vo 1959 (12) 41

KOCHETKOV, A. V.
M. 2363. Casting bimetallic crown gears with cast-on cags.
Liteinoe proiz-vo 1959 (12) 40

KOLCHINSKII, V. M.
M. 2341. Casting in ceramic moulds.
Liteinoe proiz-vo 1959 (12) 2-3

KUPTSOV, M. P.
M. 2363. Coating cast iron crucibles for melting aluminium alloys.
Liteinoe proiz-vo 1959 (12) 39

KUROCHKIN, P. D.
M. 2342. Casting blast furnace iron.
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PARFESSA, G. I. & ROSSOSHINSKII, A. A.
M. 2485. Electrolytic polishing for bringing out the structure of welded seams on titanium.
Zavodsk. laboratoriya 1959 25 (2) 185

SHCHERBINA, V. A.
M. 2363. Extraction of metallic inclusions from spent moulding mixtures.
Liteinoe proiz-vo 1959 (12) 42

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M. 2363. The problem of automatic mould filling.
Liteinoe proiz-vo 1959 (12) 41

ZORIN, A. I.
M. 2352. Mechanization of single and small scale production of cores.
Liteinoe proiz-vo 1959 (12) 15-16

622 MINING AND MINERAL DRESSING

DAL'NOV, S. M.
M. 971. The vibration-inertia mill.
Vestn. AN KazSSR 1958 (12) 71-75

GOROSHKO, V. D.
M. 1638. The application of radioactivity to coal preparation and quality control.
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M. 1765. A radiometric method of investigation of the mechanism of coal preparation (study of the hindered-settling of bodies in liquids)
Tr. Vses. n-tekn. konf. po primeneniyu radioaktivnykh i stabil'nykh izotopov i izluchenii v narodom khozyaistve i nauke 1957 236-239

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M. 1952. Some problems of the theory of an explosion in porous subsoil.
Izv. AN SSSR, Otd. tekhn. n. mekhan. i mashinostr. 1959 (6) 36-43

628.9 ILLUMINATING ENGINEERING

IVANOVA, N. S.
M. 2410. The limitation of glare from luminaires for use in dwellings.
Svetotekhnika 1959 5 (8) 9-13

KROL, Ts. I.
M. 2410. Estimating the glare from diffused light luminaries for industrial buildings.
Svetotekhnika 1959 5 (8) 5-9

SHAIKEVICH, A. S.
M. 862. Classification of visual tasks.
Svetotekhnika 1958 4 (5) 13-20

SVIRIDOV, I. I.
M. 2410. The measurement of the brightness of luminaires.
Svetotekhnika 1959 5 (8) 18-20

629.1 TRANSPORT ENGINEERING

TAURIT, G. E.
M. 1702. Developments in electroplating and polishing at the Gor'kii motor car works, Moscow.
Vestn. mashinostroeniya 1959 (2) 65-69

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TRANSLATIONS OF RUSSIAN BOOKS

*"Atmospheric Pollution by the Carcinogenic Substance 3,4-Benzpyrene"

The rapid increase in the incidence of carcinoma of the lung which has been occurring throughout the world during recent decades has stimulated research into the distribution and effects of carcinogenic substances in man's environment. Professor Shabad has played a leading part in the study of experimental carcinogenesis in the Soviet Union during the past 30 years and with his colleague, Dr. Dikun, he has in this monograph surveyed much of the historical background leading up to the current interest in carcinogens in the air. Although each of the eight chapters is written around a particular aspect of the problem there is a great deal of overlap between them and in this translation the salient features of the book have been presented as Part A and the remainder is available as Part B.

Detailed results on the detection and estimation of carcinogenic material in soot and in atmospheric samples are given in Chapter 5 (Part A). The tables relate mainly to "snow" and other "sedimentation" samples but the limited number of results from

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*Translation of: SHABAD, L. M. and DIKUN, P. P.: "Zagryaznenie atmosfernogo vozdukha kantserogennym veshchestvom 3,4-benzpirenon", Medgiz, Leningrad, 1959, published by National Lending Library for Science and Technology, Boston Spa, Yorkshire. Part A: 40s. net. Part B: 40s. net.
This review also appears in Bulletin of Hygiene, April 1961.

"aspiration" samples show that atmospheric concentrations of 3:4-benzpyrene are in general much lower in towns in the Soviet Union than in comparable British towns. Reference is made to some exceptional figures obtained in the vicinity of an old coking plant, where concentrations of benzpyrene up to 0.4 mg/m^3 had been recorded (at least 10 000 times the normal concentration in a British town). This plant has now been rebuilt, but it is interesting to note that the inhabitants of the village in which it was situated had been exposed to very high concentrations for many years, whilst the incidence of lung cancer there was not outstandingly different from that elsewhere. In this village samples were taken both by "sedimentation" and by "aspiration" methods, but the authors' comment that this provides a link between the results of the two methods in any locality is open to criticism. 3:4-benzpyrene has been detected in the lungs of town-dwellers by the Soviet workers, but the amounts have always been very small.

The remainder of Part A is devoted to the discussion and conclusions (Chapter 8) and this provides an adequate summary of the whole work for the general reader. The reasons for considering environmental factors in relation to lung cancer are stated at considerable length and the authors consider that exposure to specific occupational carcinogens and, more particularly, to 3:4-benzpyrene in urban atmospheres has an important effect. The argument rests partly on the time-correlation, for in the Soviet Union the rapid industrialization and urban growth of recent decades has tended to increase the total amount of air pollution. Smoke from factories and houses is considered to be the main source of 3:4-benzpyrene, but the emissions from motor vehicles

and the contribution from road dust are also mentioned. Attention is drawn to the feasibility of preventing smoke emissions in new installations, and the almost complete absence of 3:4-benzpyrene in the new Siberian town of Angarsk is of particular interest. The incidence of lung cancer there is being compared with that in the neighbouring old town od Irkutsk, but differences in age distribution and other factors will limit the value of this study. The authors have given serious consideration to the role of cigarette smoking and a separate book is to be published on this subject, but they state here that 3:4-benzpyrene has been found in the smoke from Russian cigarettes in amounts similar to those found elsewhere.

Part B contains the remaining six chapters, each of which provides a detailed, but sometimes protracted, discussion of one of the above topics. The first deals mainly with the incidence of lung cancer within and outside the Soviet Union. The evidence for a rise in incidence there comes mainly from necropsy data, and it is difficult to draw direct comparisons with other material, but it is stated that the current rates are significantly lower in the Soviet Union than in several other countries. There are differences between town and country and, as in Britain, the rate appears to decrease gradually from the largest cities to the smaller towns. Chapter 2 presents a historical account of the gradual recognition of occupational cancers, leading up to the production of cancer by pure hydrocarbons. It is based mainly on experience in other countries, but there is some reference to cases of tar cancer in the Soviet Union. The carcinogenic properties of hydrocarbons are considered further in Chapter 3 and emphasis is placed on 3:4-benzpyrene. The authors conclude that there is sufficient evidence

to indict this compound as a cause of cancer in man and, in particular, as a cause of lung cancer. Chapter 4 is concerned solely with the methods of estimating 3:4-benzpyrene which have been used in the Soviet Union, and it contains a fundamental difficulty which mars the value of many of the observations. The merits of collecting samples by "aspiration" or by "sedimentation" are discussed and, contrary to the advice of some of their Soviet colleagues, the authors favour the latter. In many of their studies they have used a snow sampling method in which the deposit which has accumulated for some months on a mantle of snow is analyzed. Whilst this is extremely convenient it may bear little relationship to the amount of 3:4-benzpyrene suspended in the air, for most of it is contained in smoke particles which are too small to settle under gravity. Fluorescence spectroscopy has generally been used for the determination of 3:4-benzpyrene and a method of improving the precision by using solutions frozen in liquid nitrogen is described. Details are also given of a somewhat involved absorption method.

The various sources of 3:4-benzpyrene in a town are discussed in Chapter 6 and suggestions are made for preventing its emission. The problem is recognized as one concerning the incomplete combustion of fuel and emphasis is placed on industrial discharge, most of which are avoidable. Chapter 7 shows how improvements have been effected in some localities and gives details of the work undertaken in the new town of Angarsk. Here the residential area of the town is carefully isolated from all sources of pollution; most of the houses are served by a district heating system and a belt of woodland has been left between the industrial and residential parts of the town.

The book can be recommended to anyone who wishes to know more about work in the Soviet Union on this specialized subject of 3:4-benzpyrene in the air, but it is less useful as a general survey of the problem in urban atmospheres elsewhere.

R. E. Waller

MISCELLANEOUS TRANSLATIONS AND SURVEYS

"Selling to the USSR", B.E.A. information, 16th December 1960 (Second supplement No. 60/389).

An 8-page digest of useful information for the exporter. The various sections deal with the Soviet trading system, the initial sales approach, postal selling and visiting the USSR, advertizing, documentation for export, some legal aspects, patents and trade marks, specifications and standards, the help available from the chambers of commerce and from the Board of Trade, some background information and a short list of useful addresses and names. B.E.A. information is published by the British Engineers' Association (Inc.), 32, Victoria Street, London, S.W.1

"Engineering Products: Some Trading Figures of Communist Countries", B.E.A. information, 24th October 1960 (Third supplements No. 60/388).

Tables are given showing (1) exports to the USSR from the UK and west Germany by product grouping, (2) exports from the USSR 1957-1959, (3) Poland: total exports of machinery and equipment 1956-1958, (4) Czechoslovakia: number of items of selected engineering products exported 1957-1959, (5) Yugoslavia: exports of machinery other than electric; and of electrical machinery, apparatus and appliances 1958-1959, and (6) east Germany: number of items of selected engineering products exported 1957-1959.

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BUILDING BRICKS TYPE OF MACHINE TOOLS

T. P. Sun and K. Y. Koo

*Kexue Huabao, 1959 (3) 91

With building bricks, children can build up various types of houses and buildings. Many variations are possible and the children can make a neat job of it. Ingenious engineers have also adopted the building bricks method in the production of machine tools.

The Harbin United Machine Factory, the Chun Lee Factory and the Shenyang Heavy Machinery Factory have created this kind of building bricks type of machine tools. In general they use the following main components:- the head stock, the gear box and the beam - as the children when playing with building bricks cleverly making different types of machine tools according to the requirements of the industry. The Harbin United Machine Factory has used a limited number of components to build up 37 different kinds of machine tool. Both in production and in practical use, these newly designed building bricks type of machine tool have achieved the aims of "quantity, speed, quality and economy".

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1960 (5),(6)

From the manufacting point of view, this type of machine tool has broken away from the original classification of machine tools. Before one is built up for a certain craft, it does not belong to any class of machine tool, it is just a collection of machine parts. The versatility of the machine tool components has thus been increased. Take, for example, a machine tool factory which had to produce many various types of components before a few types of machine tools could be assembled, needs now only to produce a few basic components, it is then left to the actual users to build up different types of machine tools according to their technical requirements. In this way, production of single parts and in small quantity produces sets of large quantities, reducing the amount of work in designing, making technical preparations and wooden patterns, etc, thereby speeding the output of machine tools and accelerating the progress of our industrial production.

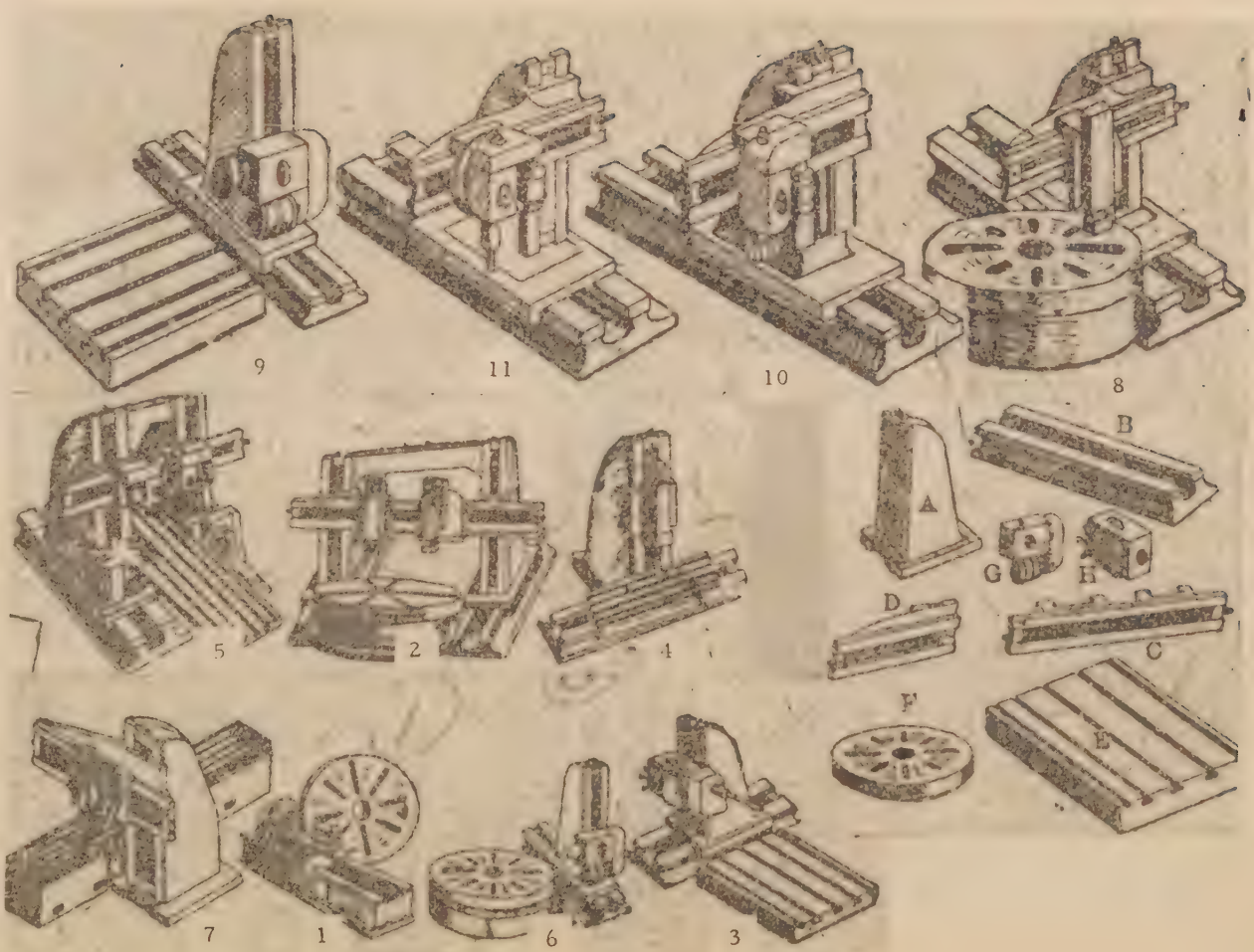
From the user's point of view, one gets the largest number of classes and types of machine tools with the minimum expenditure. For example, the building bricks type of machine tools, successfully designed by the Shenyang Heavy Machinery Factory, have only 24 different components which can be made into 11 types and 25 sizes of machine tools. Thus the usual problems of unbalanced capacity can be effectively solved; for example, when the number of drilling operations is large while that of the cutting operations is small, the assemblies can be dismantled and reassembled into the required type. The rate of utilization of building brick type machine tools is thus higher than that of the ordinary large machine tools.

From the point of view of machinery operations, the production rate of the building brick type of machine tool is also higher.

Because they can be formed into an array of machinery on a large working table, some can even be installed on the workpiece itself, all performing different operations at the same time. (This resembles the killing of a tiger, when some are on the back of the animal while the others are holding its tail, removing its eyes and teeth.) Whatever the size and the quantity of the work to be done, the building brick type of machine tool can do them all; so the workers at the Harbin factory proudly said "We can machine workpieces of unlimited size".

The following table enumerates the type of machine tools created by the Harbin United Machine Factory, the Shenyang Heavy Machinery Factory and the Shanghai Precision Machinery Factory.

A similar "building bricks" - type range of machine tools is being manufactured in Czechoslovakia and technical details were published in "Obráběcí stroje 1961", SNTL Praha 1960, pp. 488-504. - Ed.


9
11
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3

Component Parts / Names of Machine Tools	Names of Components								
	Vertical Column (A)	Machine Bed (B)	Horizontal Tool Beam (C)	Cantilever Tool Beam (D)	Work Table (E)	Face Plate (F)	Power Unit (G)	Gear Box (H)	Other Special Components
Horizontal Lathe (1)		1				1			1 Head Stock 1 Slide
Vertical Lathe (2)	2	1	1			1			2 Slides
Horizontal Drill (3)	1	1			1		1	1	
Vertical Drill (4)	1	1			1 (small)		1		
4 Spindle Milling Machine (5)	2	2	1		2		4		A few special components
Gear Wheel Milling Machine (6)	1	1				1	1		A few special components
Horizontal Grinding Machine (7)	1	1		1	1 (long)		1		
Single Column Horizontal Lathe (8)	1	1		1		1			1 Slide
Horizontal Milling Machine (9)	1	1			1		1		
Single Column Milling Machine (10)	1	1		1			1		
Vertical Drilling Machine (11)	1	1		1			1		

APPLY MORE EXTENSIVELY THE INDUSTRIAL METHOD OF ROLLING-UP WELDED SHEET CONSTRUCTIONS

*B. V. Popovskii

+Montazhnye i spetsializirovannye raboty v stroitel'stve, 1960 (11) 7-11

Soviet engineers have developed the novel method of constructing sheet structures consisting in factory manufacture of flat strips made up by welding on automatic welding machines and then rolled up into coils of convenient size for transport, which, on erection, are unrolled to the required curvature.

This method has been shown to be much more effective than the former practice of erecting sheet by sheet on site when constructing tanks and gas holders and it is equally valid when the method is used for many other types of sheet structures such as industrial storage space and apparatus for chemical and cement works, for metallurgical works, for aluminium manufacturing plants and others.

A number of examples of the application of this method to the construction of various sheet structures are given below. Horizontal cylindrical tanks are widely used in capacities of 25, 50 and 75 m^3 for storing petroleum products. The tank diameters do not exceed the usual railway loading gauge. Such tanks are

*Lenin Prize winner

+LLU shelf mark: R01175. Holding: 1960 (2) -

manufactured in a factory or in workshops by assembling previously rolled segments. This process is slow, laborious, and it is difficult to apply mechanized methods of welding to it. It was found much more efficient to weld flat sections in the downward position and then to bend them round to form the cylindrical surfaces of tanks. The strips are rolled on to several rigid circular frames which form the flat ends of the tanks or act as internal diaphragms (Fig. 1). Because of its technological and economic advantages the new method of making horizontal tanks has displaced the old method of assembling separate sections.

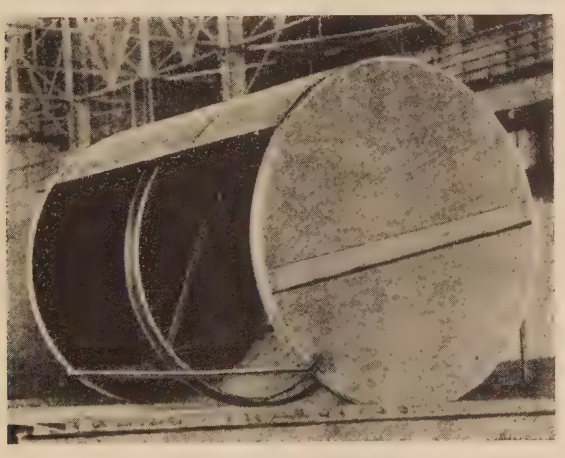

Fig. 1. Manufacture of a horizontal tank by the rolling method.

Series production of horizontal cylindrical tanks is carried out on special jigs. In some cases it is advisable to make sheet structures by rotating them on simple jigs, as was done when manufacturing in a short space of time a large number of horizontal tanks for agricultural use and also rolled-up tanks of small capacity. In this case the steel sheets are laid down on a level floor and are then built up into flat strips and welded by auto-welding tractors. In this case there is no jig for rolling up the construction. The strips are rolled up on to a grid type framework by means of a winch or a tractor. Sometimes this framework is used for turning over the strips so that the joints can be welded from the other side.

Use of the turning method of manufacturing horizontal tanks made it possible greatly to increase the output; there was a reduction in the amount of labour required and in the cost of manufacture of the tanks.

Glavneftemontazh (Chief Oil Construction Trust) has already made oil tanks of 100 - 300 m^3 capacity on temporary sites under field conditions by preparing flat strips and subsequently rolling them up. This method is now being used by certain organizations of the Ministry of Construction of the Kazakh SSR where the factory manufacture of tanks has not yet been organized. This method has been used by the Karaganda Mechanical-Erection Directorate to make walls of silos for storing cement.

A similar procedure was adopted by the Stal'montazh (Steel Erection) Trust and the Promstal'konstruktsiya (Industrial Steel Construction) Institute in developing methods of making cylindrical sheet linings for 'decomposers', which are cylindrical

vessels 9 m diameter and 35 m high that are installed in large numbers at aluminium works. The assembly and automatic welding of strips of 28 x 6 m made of sheet from 6 to 12 mm thick is to be carried out on a jig in a temporary building, and the turning over of the strips, welding them on the reverse side and winding them up on the framework formers to the required diameter will be carried out on open racks. The prepared sections are transported to the place of erection and erected on site with a tower crane.

Although this procedure does not fully realize all the advantages of industrial production of sheet constructions nevertheless it affords the erection organization a number of important advantages as compared with the sheet by sheet assembly of decomposers namely: the use of automatic welding in the downward position for the greater part of the welds; erection of the structure in sizable units; and integrated mechanization of the work.
Steel cladding is required in the construction of certain types of non-metallic storage tanks, it is usually 4 mm thick.

Because the tanks and their cladding are of large size the costs and labour involved in making them up from separate sheets and welding are high and they hinder the conduct of other constructional work on the tanks, greatly increasing the construction time. In this case too, the rolling-up method was very effective. The cladding for several reinforced concrete tanks was prepared on an installation made for the construction of surface steel tanks.

It is of interest to apply the method of rolling-up steel strips in constructing underground tankage of the trench type. The store consists of an open trench in the ground provided with a steel

lining laid on a waterproof layer. Centralized manufacture of the lining strips for this kind of storage permitted considerable reduction in the work required for erection and welding of the lining (the developed area of which was about 1000 m^2) and cut down the construction time of the storage.

An important step in the introduction of the rolling-up method in the construction of integrated structures of blast furnaces is the commencement of factory manufacture of air-heater casings in the organization of Ukrglavstal'konstruktsiya (Ukrainian Chief Steel Construction) and in Glavstal'konstruktsiya (Chief Steel Construction) of the Ministry of Construction of the RSFSR. The shell of an air heater is 9 metres diameter and the height of the main cylindrical part is 36 metres it is made of sheets of steel grade St. 3 - 14 mm thick or of steel grade 14G2 - 10 mm thick.

In preparing for the industrial production of the air heater parts it was decided to build up the main cylindrical part of the framework in 6 sections (see Fig. 2). On changing over from

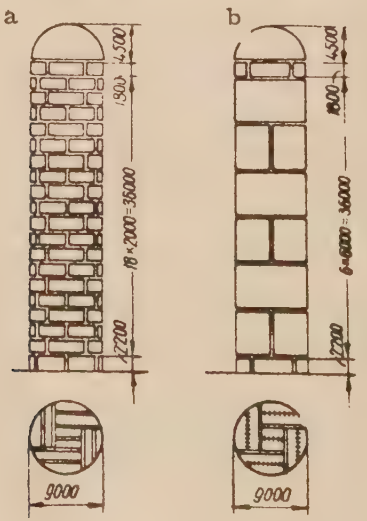

Fig. 2. The breakdown of an air-heater shell into parts for erection;
a - with sheet-by-sheet assembly
b - by the rolling-up method

sheet-by-sheet construction to rolled-up construction the number of parts despatched was reduced from 132 to 37; the average weight of a single part rose from 0.86 to 3 t and the maximum weight of a part despatched from 1.6 to 13.4 t. In the case of sheet-by-sheet assembly all the welds were made by hand, with the rolled-up method 60% of the welds in the cylindrical part were welded on automatic welding machines under factory conditions.

Strips of steel sheets, grade 14G2, 10 mm thick were assembled, butt welded and turned in pairs on the jigs used for the manufacture of rolled-up welded tanks of the Zaporozhskii Zavod metallokonstruktsii (Metal Construction Works).

Another method of erection that was used to make air heaters of rolled-up construction was developed by the Ukrproektstal'-konstruktsiya (Ukrainian Design Institute for Steel Constructions) Institute. In this project, on the erection site the coils were unwound on a fitting with two ring-templates that were joined together and turned on a roller bed (Fig. 3). The outer edge of

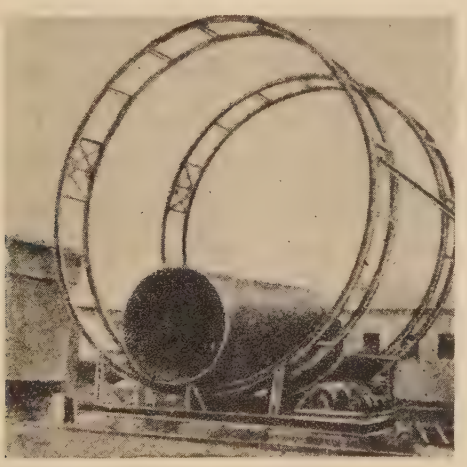

Fig. 3. Rig used to uncoil air-heater shells

the coil of strip was inserted in the ring and fixed to it with temporary clips. As the rings turned the strip unrolled to the designed diameter of the unit, and was fixed in position by clamps. When a coil had been completely unrolled the second edge of the strip was drawn to the rings by means of wire ropes. The final weld was made in the downward position with an automatic welding machine working under flux. After the final weld had been made the rolls were lifted into the upright position by a crane and the template rings removed. The rig was provided with welding devices and the necessary supports and staging; its weight is 17 t. The welded units are installed in the required position by means of a tower crane of appropriate capacity.

The Promstal'konstruktsiya Institute of the Ministry of Construction of the RSFSR has worked out a project for unwinding coils of sheeting in the vertical position by means of a special unwinding rig. This cuts out the operation of turning up the uncoiled shell from the horizontal to the vertical position.

The advantages of the various methods of erection that have been developed and also of other possible methods are determined as experience of the work is accumulated. However, mention can already be made of the great advantages of the rolled-up method of erecting air heaters compared with sheet by sheet assembly. According to data of Ukrglavstal'konstruktsiya the labour required for erection is reduced by 24%. The erection time has been approximately halved, (9 days instead of 19 - 22 days with the sheet-by-sheet method).

This number of the journal includes an article on the construction by the Koksokhimmontazh Trust of benzole scrubbers

using the rolling-up method*. These examples indicate that the erectors have acquired valuable experience which can soon lead to the extensive application of the rolled-up method in the making of many other structures of the ferrous and non-ferrous metallurgical industries: filters, gas purifiers, etc.

This method can also be used to make certain kinds of manufacturing equipment that are outside the loading gauge. In some cases the metal thickness may be considerably greater than in the constructions described above.

G. V. Raevskii, Lenin Prize winner, who is on the staff of the Institut elektrosvarki im. E. O. Patona ("E. O. Paton" Electric Welding Institute) of the Academy of Sciences of the Ukrainian SSR proposed the factory manufacture of the shells of cement kilns and various kinds of vessels and apparatus required in manufacturing plant, which were too big for transport (greater than 4.5 m diameter), in such a form that they could be transported to the erection site. In this case a single butt joint is left unwelded in the cylindrical casing which is then rolled-up within the limits of elastic strain so that one edge is inside the other, so reducing the diameter (Fig. 4).

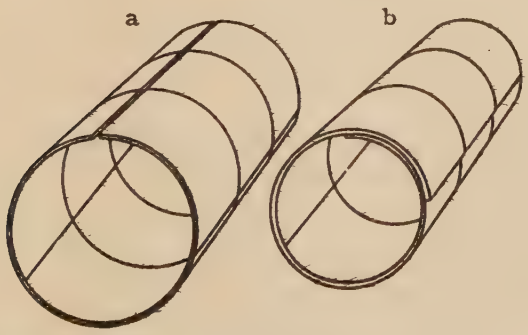

Fig. 4. Section of cement kiln
a - before and after transport
b - during transport

*pp. 11-14 (Ya. M. Eidel'stein) - Ed.

It has been calculated that in this way the diameter of casings can be considerably reduced and transportable parts can be made even when the metal is 25 - 30 mm thick and more. After tests had been made (Fig. 5) the factory manufacture by this method of casings for cement kilns was developed and introduced.

Fig. 5. Experimental manufacture of cement kiln shell

On erection, the clamps that hold it in the distorted condition are removed and it springs back to the required size. In such cases the crossed over edges are additionally stretched on erection. This method of double straining still further extends the field of application of the method.

The method of rolling-up is also very effectively used in making thin sheet constructions such as flat coiled tubes.

Low pressure tubes (up to 10 - 12 atm) are required in

large quantities and the requirements are not fully met by the metallurgical industry. These tubes are made with comparatively thick walls. The lengths are short, usually 6 metres, and this involves a great deal of work in the construction of pipe lines in assembling the tubes and welding the ends together.

Flat coiled tubes were developed by the Institut elektrosvarki im E. O. Patona and consist of two thin steel strips laid one on another and welded along the edges by contact or arc welding (Fig. 6).

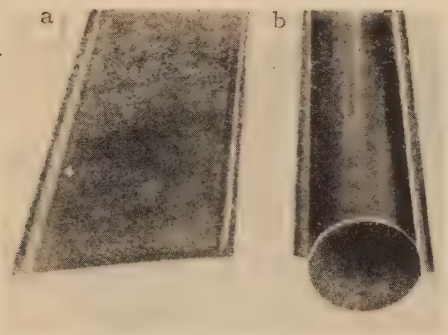

Fig. 6. Flat-coiled tubing
a - before inflation
b - after inflation

The flat welded strips are converted into a tube by inflation under internal pressure. Small projecting strips are left at the welds. The walls of flat-coiled tubes may be made relatively thin and so they use less steel than ordinary tubes as manufactured by the industry. Flat coiled tubes of 100 mm

diameter are manufactured with wall thicknesses of 1.5 - 2 mm and tubes of 300 mm diameter with wall thickness of 3 - 4 mm.

Flat coiled tubes can be made in almost any length on a continuous machine. If the weight of a roll is limited to 5 t a single roll may contain up to 200 m of strip for tubing of 300 mm diameter or 1070 m of strip for tubing of 100 mm diameter. For convenience of transport and erection welded tube strips hundreds of metres long are rolled-up in coils (Fig. 7).

Fig. 7. A coil of flat-coiled tube

The outside diameter of tubing coils may vary from 1.8 to 3 m depending on the diameter and wall thickness of the tubing, the length of the sections of tubing and the conditions of transport. Flat coiled tubes are simple to lay. The coil is unrolled at the place of erection and then the blank is blown up by means of a compressor or cylinders of compressed air at a pressure of 10 - 12 atm. Several methods have been developed for unwinding the coils using various devices for this purpose. The erection of pipe lines of flat coiled tube is simpler than with ordinary tube. There is no laborious work in laying out the individual short tubes along the run of the line or in assembling and welding the tube ends. For instance, a pipeline 100 mm diameter, 1.2 km long of ordinary tubing in lengths of 6 metres requires 200 welds, whilst one of flat coiled tubing can be erected without a single weld.

Various kinds of welded and breakable joints have been developed for the ends of flat coiled tubes. Steel flat coiled tubes laid on the surface of the ground are protected from corrosion by painting; and those laid in the ground by bituminous insulation.

The use of aluminium flat welded tubes has considerable possibilities in the construction of pipelines. They last longer in corrosive media. Such pipelines require no external insulation in grounds which are free of water and are not alkaline.

During 1957-58 the Specialized Directorate No. 70 of Trust No. 7 of Glavneftemontazh laid a number of gas and oil pipe lines on sites of Tatneft (Tartar Oil Industry) of flat-coiled

steel and aluminium tubes of 100 - 150 mm diameter. According to the directorate the use of flat-coiled tubes increases the labour productivity in the construction of pipelines by a factor of 10, cuts the construction cost by a factor of 3 and greatly reduces the time required to carry out the work.

Pipe lines of steel and aluminium flat coiled tubing have already operated for several years under production conditions in the Ukraine, in Turkmenia and Tartaria.

The extensive and successfully application of the rolling-up principle in the manufacture of various welded sheet structures ranging from oil tanks and gas holders with volumes of thousands of cubic metres (with wall thicknesses up to 30 mm) down to flat coiled tubes with wall thicknesses of 1.5 - 2 mm, convincingly demonstrates the advisability and effectiveness of applying this principle in constructional practice. This is to be explained by the extensive possibilities afforded by the basic idea of the method, the industrialization of erection work.

With the object of further extension of the field of application of the highly effective rolling-up method in the construction of sheet structures the organizations of the Ministry of Construction of the RSFSR will very shortly take the following steps:

generalize existing experience in this field and apply it extensively in all erection organizations of the ministry,

determine the possibilities of applying the rolling-up method in the manufacture of new kinds of sheet construction and organize its introduction in preparatory design work and other measures,

organize scientific investigations and conduct experimental work in new fields of application of the rolling-up method for sheets of considerable thickness made of low alloy steels and aluminium alloys.

APPLICATION OF REINFORCED CONCRETE FOR THE MANUFACTURE OF PARTS FOR HEAVY MACHINE-TOOLS

I. V. Gellert

*Byulleten' tekhniko-ekonomicheskoi informatsii, 1960 (8) 72

The technical and economical council of the Moscow regional sovnarkhoz (Council of National Economy) has discussed the experience of the Kolomna heavy machine-tools plant, in the application of reinforced concrete as machine building material for the manufacture of parts of heavy machine-tools and presses.

The plano-milling machine, model 7288S (dimension of table 3.75 x 12 m) built by this factory, with the base parts made of welded metal members in conjunction with a high strength concrete has shown good results under condition of prolonged operation; it has now been in operation for over five years quite satisfactorily. The parts of the machine with the same weight, external shape and dimensions as those made of cast iron, possess great rigidity and better resistance to vibration; they may be transported, turned over and adjusted during the operation thus ensuring the predetermined accuracy of the machine.

Thanks to a new method of the shaping of the basic parts, it has been possible to economize up to 70% of metal and more than

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*LLU shelf mark: R00241: Holding: 1958(1) -

100 m^3 of high quality timber used for making patterns. The production time for the manufacture of the machine has been reduced to $\frac{1}{3}$ or $\frac{1}{4}$.

The technological process of manufacturing base parts of the machines using reinforced concrete lies in the following:- The external and internal surfaces of the base parts are formed by a metal casing 1.5 - 3 mm thick. The surfaces of the parts, which are required to possess specified grades of accuracy and finish (guides, bearing and contact plates, etc.) are formed of separate constructional members, using steel type 35 of thickness 10-30 mm, and are welded together. These constructional members are preliminarily machined on the metal-cutting machines with allowances for subsequent grinding and scraping.

The apertures in bearing and contact plates are drilled beforehand. Before filling the mould for the base part with concrete mixture, metal pipes are inserted in places where apertures are required. The inner spaces formed by metal casing and inserted bearing and contact plates are filled with concrete mixture, with a ballast consisting of granite chippings and quartz sand. The pouring holes are blocked with covers, after which the part remains on the stand until the concrete reaches its predetermined strength. Following this, the parts are freed of stand plates and angles, and then sent for the finishing process, checking, filling, painting and finally, for assembly. The base parts of a hydraulic press are subjected to pre-stressing.

In 1960 the factory was engaged in the manufacture of the hydraulic press, model PP-4 of 4000 t capacity with base parts made of reinforced concrete.

Having appreciated the great economic and technical importance of the application of the reinforced concrete in the manufacture of machine-tools and machines, the technical and economical council has recommended the speeding up in the Kolomna heavy machine-tools plant of the construction of a reinforced concrete parts shop with an annual output of 10 000 t.

ENIMS (Experimental Institute of Scientific Research for Metal Working Machine-Tools) and the Institut zhelezobetona (Institute for Reinforced Concrete) are developing instructional manuals for designers engaged in the design of ferro-concrete base parts and heavy machinery which indicate the fields of application, technological requirements of construction applied in the design of the mechanical characteristics, co-efficients and data appertaining to the standardization of the constructional members.

The decision of the technical and economical council has been approved by the sovnarkhoz (Council of National Economy) and has been sent to various organizations for attention.

LIBRARIES OF THE ACADEMY OF SCIENCES OF THE USSR

The library system of the Academy of Sciences of the USSR comprised in January 1959 270 libraries of which 115 were very small (average holding 500-600 bibliographic units); these very small libraries were largely to be found in seismic and geophysical stations.

Descriptions of the 155 larger libraries in the system were published in "Biblioteki Akademii nauk SSSR: Spravochnik" (Libraries of the Academy of Sciences of the USSR: Handbook), Izd. AN SSSR, Moscow 1959 (LLU shelf mark: XR 18250), and the following details extracted from this handbook are published below: (1) transliterated name of library, (2) translated name, (3) address, (4) telephone number, and (5) size of holding.

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Libraries of Universal Scope of Covering Complex Subjects

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VOSTOCHNOE OTDELENIE BIBLIOTEKI AKADEMII NAUK SSSR — 300 800

(Eastern division of the Library of the Academy of Sciences of the USSR)
Novosibirsk, Sovetskaya ul. 20;
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BIBLIOTEKA BASHKIRSKOGO FILIALA AN SSSR — 94 750

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Ufa, Sovetskaya ul. 13/15;
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BIBLIOTEKA VOSTOCHNO-SIBIRSKOGO FILIALA AN SSSR — 70 720

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BIBLIOTEKA KOL'SKOGO FILIALA im. S. M. KIROVA AN SSSR ("S. M. Kirov" Kola branch of the AS USSR, library) P/O Apatitovaya gora, Murmanskoi obl., ul. Kirova 9a; tel. 1-41, two rings	119 380
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*The former Moldavian branch of the AS USSR is now the Academy of Sciences of the Moldavian SSR - Ed.

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BIBLIOTEKA URAL'SKOGO FILIALA AN SSSR — 128 990

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Physical and Mathematical Sciences

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Gosudarstvennyi astronomicheskii institut im. P. K. Shternberga (GAISh),
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BIBLIOTEKA GEOFIZICHESKOI STANTSII "YALTA" INSTITUTA FIZIKI ZEMLI im. O. Yu. SHMIDTA (Yalta Geophysical Station of the "O. Yu. Shmidt" Institute of the Physics of the Earth, library) Yalta, Zarechnaya 26; tel. 23-04	2 190
BIBLIOTEKA GLAVNOI ASTRONOMICHESKOI OBSERVATORII (Main Astronomical Observatory, library) Leningrad M-140, Pulkovo; tel. K8-84-13	92 360
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BIBLIOTEKA INSTITUTA TEORETICHESKOI ASTRONOMII (Institute of Theoretical Astronomy, library) Leningrad V-164, V. O., Mendeleevskaya liniya 1; tel. A2-61-34	63 100
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BIBLIOTEKA GLAVNOGO BOTANICHESKOGO SADA (Main Botanical Garden, library) Moskva I-273, Ostankino, Glavnyi botanicheskii sad, Laboratornyi korpus; tel. I3-96-11	94 780
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BIBLIOTEKA INSTITUTA VYSSHEI NERVNOI DEYATEL'NOSTI (Institute of Higher Nervous Activity, library) Moskva V-95, Pyatnitskaya ul. 48; tel. V1-29-23	27 150
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BIBLIOTEKA SEVERNOGO OTDELENIYA INSTITUTA LESA (Northern Division of the Institute of Forestry, library) Arkhangel'sk, prospekt P. Vinogradova 82	23 440
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Technical Sciences

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BIBLIOTEKA INSTITUTA MASHINOVEDENIYA (Institute of Mechanical Engineering, library) Moskva Zh-127, ul. Osipenko 52; tel. V1-76-80	34 900

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BIBLIOTEKA INSTITUTA MEKHANIKI (Institute of Mechanics, library) Moskva D-40, Leningradskii prospekt 7; tel. D0-00-00, dob. 93	27 000
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REPORTS ON VISITS

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BIBLIOGRAPHY, LIBRARIES

RANGANATHAN, S. R. : "VINITI - All-Union Institute for Scientific and Technical Information", Annals of Library Science, June 1960, pp. 53-62.
(Report on visit in September 1959. Includes a detailed description of the procedures adopted in the preparation of the Referativnyi zhurnal and other publications.)
LLU shelf mark: V 73

MILLER, J. : "The Lenin Library", Library Review, Spring 1961, pp. 26-29.
(Report on recent visit. Includes a description of the reading room procedures.)
LLU shelf mark: V 102

KENT, C. D. : "Libraries and Museums in Scandinavia To-Day" Canadian Library Association, Room 606, 63, Sparks

Street, Ottawa 4, Canada, April 1960.
(Report on visit in late 1958 to libraries in Denmark, Norway, Sweden, Finland and the USSR where the libraries visited included the Hermitage, the Saltykov-Shchedrin, the Chekhov (Fruzensky District) libraries and the Library School in Leningrad.)
LLU shelf mark: V 103

AUTOMATION

AUGER, R. N.: "Tool Control Techniques in Russia's Sverdlov Plant", Automatic Control, 1961 (1) 32-34.
(Report on visit to Sverdlov Machine Tool Plant in Leningrad in 1960.)
LLU shelf mark: V 104

WELDING

WECK, R., et al.: "Welding Research and Development in the USSR". British Welding Research Association, Abington Hall, Abington, Cambridge, October 1960.
(Report on visit by BWRA team in September 1960. Institutes visited include the E. O. Paton Arc Welding Institute of the Ukrainian Academy of Sciences, Kiev, the "A. A. Baikov" Institute of Metallurgy of the Academy of Sciences of the USSR in Moscow, VNIIESO - the All-Union Scientific Research Institute for Electric Welding Equipment in Leningrad, TsNIITMash - the Central Scientific Research Institute for Plant and Machine Building in Moscow, and MVTU "Bauman" Higher Technical School in Moscow. The welding exhibition within the permanent Exhibition of Economic

Achievements of the National Economy of the USSR in Moscow was also visited. General notes on visits to Russia are appended, and in these points connected with the best size of a visiting party, travelling arrangements and time wasting by formal speeches are made.)

LLU shelf mark: V 79

AGRICULTURE

JOHNSON, S.E., et al.: "Economic Aspects of Soviet Agriculture - Report of a Technical Study Group". Agricultural Research Service, US Department of Agriculture, Washington, D.C., May 1959.

(Report on a one-month visit in July 1958 by 6-man team. 16 collective and state farms were visited and these included in the Krasnodar region: the "Kalinin" Collective Farm, the "Red Star" Collective Farm, the "Kubanets" State Farm, and the "Agronomist" State Farm; in the Southern Caucasus region: the State Poultry Farm near Adler; in the Rostov region: the "Lenin" Collective Farm near Taganrog; in the Kiev region: the "Friendship" Collective Farm, the State Farm and Animal Husbandry Experiment Station; in Crimea: the "Friendship of Peoples" Collective Farm; in the Tashkent region: the "Stalin" Collective Farm and the "Fifth Anniversary of Uzbekistan" State Farm; in the Akmolinsk region: the "Victory" Collective Farm and the State Farm and Scientific Research Institute for Grain Crops; in the Novosibirsk region: the "Lenin" Collective Farm;

in the Leningrad region: the "Eighteenth Congress of the Communist Party" Collective Farm, and the "Bolshevik" State Farm. The report includes production and other statistics.)
LLU shelf mark: V 65

FRASER, J. R.: "ISO Technical Committee 34 Agricultural Food Products: Visit to Budapest, Hungary". Unpublished note by author, c/o British Standards Institution, 2, Park Street, London W.1.
(Note on visit in October 1960. Visits were made to a co-operative farm in Szekesfehervar, the Maize Hybrid Research Institute in Martonvasar, and the Technical University Food Institute in Budapest, but no details are given.)
LLU shelf mark: V 105

RAILWAY TRANSPORT

HUTTER, R.: "Les Chemins de Fer en URSS", Problemes Economiques, 1st November 1960, pp.13-19.
(Reprint from Transports, March 1960.)
(Report on 3-week visit in November and December 1959.)
LLU shelf mark: V 106

CHEMICAL ENGINEERING

JONES, J. I.: "Some Impressions of Soviet Research in Polymer Chemistry". D.S.I.R., National Chemical Laboratory, Teddington, Middx.
(Report on visits to various research laboratories on the occasion of the International Symposium on

Macromolecular Chemistry, Moscow, June 1960, by members of the British delegation and by Dr. C. H. Bamford, guest of the USSR Academy of Sciences. Detailed information is given on the Institute of Chemical Physics, Institute of Petroleum Chemistry, Lomonosov State University, Institute of Elemento-Organic Compounds, Institute of Biophysics, Zelinsky Institute of Organic Chemistry, the Scientific Research Institute for the Tyre Industry, the Rubber Department in the Lomonosov Institute of Chemical Technology, and the Plastics Institute (all in Moscow), and the Institute of Macromolecular Chemistry in Leningrad.)
LLU shelf mark: V 100

JONES, J. I.: "Research in Organic Semiconductors in the USSR - Some Impressions gained During the International Symposium on Macromolecular Chemistry, Moscow, 14 - 18th June, 1960". D. S. I. R., National Chemical Laboratory, Teddington, Middx.
(Report on visit to Institute of Chemical Physics of the Academy of Sciences of the USSR in Moscow. Includes translations of papers by M. A. Geiderikh et al. and by A. A. Berlin.)
LLU shelf mark: V 101

BUILDING

--- "U. N. European Economic Commission Housing Committee: Study Tour of the USSR". Gosstroiizdat, Moscow 1959.

(Illustrated report of general impressions of visit in July 1959 to housing development areas in Moscow, Leningrad and Kiev. Text is in Russian, English and French.)

LLU shelf mark: V 99

L. L. U. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. centre, L. L. U. has received currently the translations listed below.

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531 MECHANICS

GALAKA, P. I.
M. 2672. Certain characteristics of the oscillatory system in which two colliding masses have an elastic connection between them.
Dopovidi AN URSR 1958 (7) 712-715

KOLDOBSKAYA, T. G.
Problems of nearly self-similar unsteady motion.
Vestn. Leningr. un-ta 1960 (1) 111-122
in 052805 ARS Journal Russian Supplement 1960 30 (9)

LOITYANSKII, L. G.
M. 2605 On the theory of a spherical bearing
Prikladnaya matem. i mekhan. 1956 (1) 133-135

MARKOV, N. M. & DOBROKHOTOV, V. D.
M. 2702. The results of the investigation of velocity stages.
Energomashinostroenie 1960 (6) 21-23

TSENOV, I.
M. 2870. Gauss's principle of least action.
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To increase the durability of the blast-furnace hearth pad it is recommended that its bottom and peripheral parts should be made of graphitized blocks and carbon blocks with the upper part made up of a few courses of high-aluminium brick so that the surface corresponds approximately to the pig-iron fusion isotherm. A full report appeared in Stal' in English, 1960 (12).

TRANSLATIONS OF RUSSIAN BOOKS

Consultants Bureau Enterprises, Inc., New York, report that the following books announced in the January 1961 issue of the NLL Translations Bulletin have now been dropped from their translating programme:

*LOSEV, B. I., et al.:	"Solid gasoline"
MAISKII, I. N., et al.:	"Problems in transplanting and conserving organs and tissues"
OBOLENTSEV, R. D., et al.:	"Chemistry of organosulfur compounds contained in petroleums"

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* A translation of this book has now been published by the O. T. S., Department of Commerce, Washington 25, D. C. as PB 60-21208 - Ed.

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Abstracts of selected articles in technical and scientific journals published in the USSR and the Peoples' Democracies are being published by the O. T. S., U. S. Department of Commerce, Washington 25, D. C. as from 1st January 1961.

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MAKARA, A. M. et al.
RTS 1810. Investigation into the distribution of hydrogen in welded joints of medium-alloy steels with austenitic and ferritic welds.
1958 (11) 16-31 40s.

BEZOPASNOST' TRUDA V PROMYSHLENNOSTI (Work safety in Industry)

KRAVCHENKO, V. S. et. al.
RTS 1762. A continuous-action methane relay.
1960 (2) 22-24 7s. 6d.

DOKLADY AKADEMII NAUK SSSR (Reports of the Academy of Sciences of the USSR)

GENKEL', N. A. & KOLOTOVA, S. S.
RTS 1753. A comparative method of assessing the degree of salt resistance of cotton.
1943 39 (5) 209-212 10s.

ALEKSANDROV, V. Ya. & ARRONET, N. I.
RTS 1792. Adenosinetriphosphate causes movement of the cilia of ciliated epithelium killed by extraction with glycerol ("cell model").
1956 110 (3) 457-460 10s.

ENERGOMASHINOSTROENIE (Power Machine Construction)

VERBIN, D. S. & SHEPILEVSKII, V. M.
RTS 1789. Automatic carbon-dioxide-shielded arc welding of steam turbine diaphragms at the Leningrad engineering works.
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FIZIKA METALLOV I METALLOVEDENIE (Physics of Metals and Metallography

KRISHTAL, M. A.
RTS 1610. Calculating the activation energy in diffusion processes.
1956 (2) 303-308 15s.

IZVESTIYA AKADEMII NAUK SSSR. OTN: ENERGETIKA I AVTOMATIKA (Bulletin of the Academy of Sciences of the USSR. Section of Technical Sciences: Energetics and Automation)

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RTS 1749. The influence of oscillatory disturbances on the stability and dynamic characteristics of non-linear automatic systems.
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RTS 1775. The connection between the magnetic field and motion in single sunspots.
1960 23 277-290 35s.

IZV. VUZ: PISHCHEVAYA TEKHNOLOGIYA (Food Technology)

DZYADZIO, A. M.
RTS 1745. On the question of the hydrodynamics of pneumatic conveying.
1959 (4) 98-111 35s.

KHIMICHESKAYA NAUKA I PROMYSHLENNOST' (Chemical Science and Industry)

PETROV, N. A.
RTS 1751. Surface-active materials in the food industry.
1959 4(5) 617-622 15s.

KHIMICHESKIE VOLOKNA (Chemical Fibres)

PEREPELKIN, K. E.
RTS 1808. Basic mechanism of the deaeration of viscose.
1959 (3) 39-43 10s.

KOLLOIDNYI ZHURNAL (Colloid Journal)

CHERNENKO, L. E. et al.
RTS 1766. Structure formation during the processing of chocolate masses and the influence of diluents.
1951 13(5) 379-382 10s.

MATERIALY VSESOYUZNOGO NAUCHNO-ISSLEDOVATEL'SKOGO GEOLOGICHESKOGO INSTITUTA: GEOLOGIYA I POLEZNYE ISKOPAEMYE (Papers of the All-Union Scientific Research Geological Institute: Geology and Mineral Resources)

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RTS 1699. Some geological features of metamorphic ore deposits.
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MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVA (Mechanization and Automation of Production)

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RTS 1806. A universal system of units (reply to a letter to the Editor).
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ADRIANOV, V. N.
RTS 1801. Some problems of the theory of radiant heat transfer in one-dimensional systems.
1960 (6) 63-66 10s.

SIROTA, A. M. & MAL'TSEV, B. K.
RTS 1826. Experimental data for the specific heat of steam at pressures of 300-500 atm and temperatures of 500-600°C.
1960 (10) 67-68 2s. 6d.

TSVETNYE METALLY (Non-ferrous Metals)

MAKAROVA, T. I. & SOSNOVSKII, G. N.
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USPEKHI KHIMII (Progress of Chemistry)

MALINOVSKII, M. S.
RTS 1759. Preparation of $_a$-oxidic compounds.
1958 27(5) 622-642 50s.

VOPROSY POROSHKOVOI METALLURGII I PROCHNOSTI MATERIALOV (Problems of Powder Metallurgy and Strength of Materials).

SLEPTSOV, V. M. & SAMSONOV, G. V.
RTS 1819. Boron nitride.
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ZAVODSKAYA LABORATORIYA (Works Laboratory)

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RTS 1756. Analysis of slags from copper and lead smelting processes.
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ZHURNAL EKSPERIMENTAL'NOI I TEORETICHESKOI FIZIKI (Journal of Experimental and Theoretical Physics)

FRENKEL', Ya. I.
RTS 1777. On the behaviour of liquid drops on the surface of a solid. 1. The running of drops down an inclined surface.
1948 18(7) 659-667 22s.6d.

ZHURNAL FIZICHESKOI KHIMII (Journal of Physical Chemistry)

FLORIANOVICH, G. M. & FRUMKIN, A. N.
RTS 1748. The mechanism of electrolytic reduction of anions at the mercury electrode.
1955 (10) 1827-1846 50s.

TEDORADZE, G. A.
RTS 1795. Kinetics of the oxidation of chloride ions on platinum.
1959 (1) 129-136 20s.

APPENIN, I. I.
RTS 1796. Kinetics of anode processes. Part 2. Anodic polarization of a smooth platinum electrode in solutions of perchloric acid.
1959 (2) 367-373 17s.6d.

AIKAZYAN, E. A.
RTS 1797. Passivation of the platinum electrode.
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ZHURNAL PRIKLADNOI KHIMII (Journal of Applied Chemistry)

GEL'D, P. V. et al.
RTS 1793. The electrolytic nature of commercial liquid calcium carbide.
1948 21(3) 251-259 22s.6d.

BOOK EXTRACTS

"Geologicheskoe Stroenie SSSR" (The geological structure of the USSR), edited by T. N. Alikhova. M. 1958.

RTS 1640. The Ordovician system.
187-211 60s.

"Gidrodinamika Rasplavlennykh Metallov" (Hydrodynamics of molten metals), edited by L. I. Fantalov and B. B. Gulyaev. Izd. AN SSSR, M. 1958.

RADIN, A. Ya.
RTS 1750. The interaction of aluminium with gases in the process of melting, pouring and solidification of castings.
237-257 50s.

Scientific conference on nutrition and public health, 3-7 February, 1959. Summaries of papers, edited by O. P. Molchanova. Akademiya Meditsinskikh Nauk SSSR: Institut Pitaniya, M. 1959.

RTS 1616. Selected summaries only. 30s.

Scientific conference on the pharmacology and clinical use of tranquillizers, 29 September - 1 October, 1960, at Leningrad. Akademiya Meditsinskikh Nauk SSSR: Institut Eksperimental'noi Meditsiny, L. 1960, 29pp.

RTS 1769. Summaries of papers. 65s.

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DEVELOPMENT OF SHIPBUILDING IN THE CHINESE PEOPLE'S REPUBLIC

E. L. Ruf

*Sudostroenie, 1960 (10) 71-73

The modern shipbuilding industry of the Chinese People's Republic has been built up during the years of the democratic rule of the people. The process of development began with the reconstruction and extension of the old shipbuilding concerns centred on the region of Shanghai and other "open" ports, possessing primitive equipment.

The total output of all the shipyards of the country in the course of a hundred years (up to 1949) was only about 500 000 t. At the same time, 94% of the entire river fleet consisted of wooden sailing vessels.

The first five year plan of the Chinese People's Republic, which began in 1953, envisaged an extensive capital construction. Simultaneously steps were taken to establish scientific research institutes, planning and design offices and also shipbuilding institutes, shipbuilding technical schools and trade schools for supplying the shipbuilding undertakings with skilled personnel. The old shipyards

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1956 (1)-

became large modern socialist undertakings, capable of building large-tonnage coastal and ocean-going vessels. These yards were equipped with modern machine tools, powerful hoisting and conveying machinery and welding equipment, making it possible to tackle the building of welded ships. End-launching and side-launching slipways were equipped, and the machine shops of the shipyards were re-constructed (due to this, it was possible to solve in part the problem of the installation of the main engines). Special machinery and marine equipment was made in Chinese factories or on a co-operative basis in countries of the socialist camp.

In addition to the large shipyards, some tens of shipyards for medium-sized and small ships have been extended and built in important shipping regions and fishing bases (for the building of medium and small tonnage ships for coastal waters).

With the object of increasing the quality of shipbuilding production and the development and introduction of new techniques, scientific research and development work was expanded already during the execution of the first five year plan. Up to 1949 there had been no responsible organizations in China, and the necessary research and experiment work was entrusted to foreign institutions. In 1950, a start was made on the equipment of the first model tank. All the work on its construction and equipment, including the design and production of experimental electronic control and measuring instruments was done by Chinese workmen and engineers. The tank was put into service in 1954. Later, a start was made with the building of a cavitation tunnel, an open model tank, a wind tunnel and other experimental equipment. Research and experiment work was done in the field of production of shipbuilding materials,

technology of shipbuilding, ship designs, power installations and electrical apparatus.

For co-ordinating the work on the experimental preparation for new production and for solving fundamental technical problems, central laboratories have been provided at all the largest shipyards. Educational establishments have also done a considerable amount of theoretical and experimental scientific work. Model tanks and laboratories equipped with modern instruments have been built at some of the universities.

Groups of shipbuilding experts have been trained in the Chinese People's Republic. The first small planning group, formed in 1950, has been converted into an independent planning institute, including a design office for various specialized fields.

Planning and design departments or offices have been formed at all the most important shipyards for large and medium tonnage ships. These organizations are independently designing ocean-going ships fitted with the most up-to-date equipment, fishing vessels, marine diesels and steam turbines. In 10 years, the planning and design organizations have worked out more than 100 designs for ships, several tens of designs for marine propulsion engines and thousands of drawings of ship equipment, which on the whole has satisfied the requirements of the industry.

The formation of a scientific research basis and design centres in China has assisted the extensive introduction of new techniques into industry and the production of new types of ships, which are meeting the climatic and hydrological peculiarities of ocean and river routes and ports.

Simultaneously with the establishment of undertakings, and

scientific research and development organizations, considerable attention has been paid to the training of young experts. Shipbuilding departments have been established in all the technical institutes in shipbuilding areas. In addition to the specialist institutes, branch technical colleges and schools, evening schools have been opened at shipyards and development and scientific research organizations, where teaching is combined with production activity.

In the course of ten and a half years, the total output of the Chinese shipbuilding industry has more than doubled the volume of production during the previous hundred years. The first five year plan was completed, before its term, in 1956. The completion of the first five year plan made the great advance in production in 1958 and 1959 possible. Already in 1959, the tonnage of transport and trading vessels was more than doubled compared with 1950. On 1st November 1959, the merchant fleet of the Chinese People's Republic (including vessels of upwards of 300 g. r.t.) numbered 172 ships of a total of 427 000 g. r.t. and a total dead weight of 571 000 t.

The following figures characterize the production of the shipbuilding industry during the past few years: 1957: 54 000 t (deadweight); 1958: 90 000 t; 1959: 122 000 t.

The types of ships built have also been extended considerably. In 1950 - 1951, the industry was only able to supply tugs and barges for river and lake operation; at the present time, it is supplying civil authorities and the needs of defence with large tonnage ships fitted with modern equipment. In the course of the last ten years coastal freighters with a cargo capacity of 50, 3000 and 5000 t (Fig.1) and passenger ships for coastal waters for 50, 200 and 500 passengers have been built. River freighters with a cargo capacity of 1000 and 1800 t are being built, passenger vessels for

Fig. 1. Freighter for coastal waters "Ho-p'ing-28" (Peace-28); cargo capacity 5000 t

400 - 600 and 1000 passengers, tugs of 40 to 2000 h. p. (Fig. 2),

Fig. 2. Port tug "Funu"

fishing vessels with engines of 75 to 350 h. p. for industrial organizations (Fig. 3), refrigerator ships for transporting fish, and research vessels for industrial purposes. The shipyards

Fig. 3. Whaler

are successfully coping with orders for excavating and suction dredging equipment, floating electric power stations, survey and hydrographic vessels, floating meteorological stations, ice-breakers (for use in the lower reaches of the Yangtse in the flood period), railway and motor vehicle ferries (Fig. 4), sports boats and so forth. A hydrofoil passenger vessel is being built for the Yangtse as well as an ocean going freighter with a cargo capacity of 10 000 tons (Fig. 5) and a speed of 17 knots. Most of the types of vessels indicated are being built in large series (up to 50 units).

The extension of the types of shipbuilding productions also applies in a considerable degree to ship machinery, instruments and various materials. At the commencement, the Chinese People's Republic

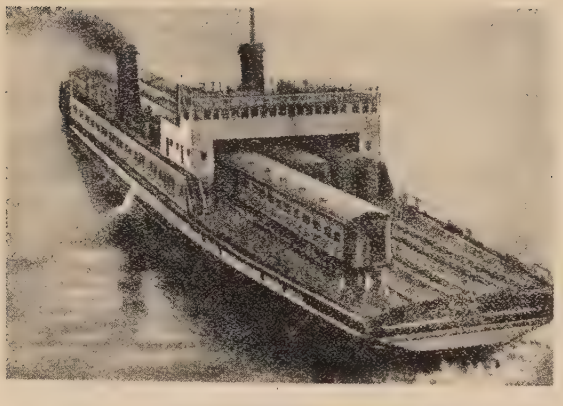

Fig. 4. Railway ferry "Su-chou" on the Yangtse

Fig. 5. Freighter "Yaochin": ("Leap Forward") cargo capacity 10 000 t

was able to supply only steam reciprocating engines of medium or low power. Improved patterns of engines of 1500 to 2400 h. p. were soon made. The production of diesels of from 5 to 900 h. p. was under way in a short time. In 1958, Chinese mechanical engineers began the design of a low-speed diesel and in four and a half months

had worked out the design and made experimental models of 2000 and 3000 h.p. engines. In the course of works tests, the models as a first approximation showed good results in regard to fuel consumption, specific power and other technical and operational criteria. After the tests, the models were handed over for further trials and improvements.

In preparation for the impending production of a silent two-stroke seven-cylinder 8820 h.p. diesel for installation in a motor ship with a cargo capacity of 10 000 t now under construction, the "Hutung" (?) factory in Shanghai made an experimental single-cylinder model of this engine at the end of 1959. A little more than three months were spent in making and assembling the parts of the model. The tests on the model will assist in improving the design for the first Chinese high-power marine diesel.

At first steam turbines were used in ships of Chinese construction. Thus, a 5000 h.p. steam turbine designed and made in the Chinese People's Republic was installed on an ocean-going freighter with a cargo capacity of 6000 t. Designs have been completed for a steam turbine of increased efficiency and a gas turbine with SPGG*, and the production of experimental models is in progress.

Electric winches and pumps, hydraulic steering machinery and couplings have been successfully developed and put into production. Marine instruments, compasses, echo sounders, radar apparatus, inspection and control apparatus, instruments for detecting shoals of fish, etc., are being made in increasing quantities. This helps to reduce the volume of imported equipment.

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*Exact meaning of this abbreviation not known - Tr.

Although in the first few years of the People's Republic most of the steel for shipbuilding, especially for ocean-going vessels, came from abroad, ordinary steels are currently being made in Chinese works. High-strength low-alloy steels are also being produced. These will be used in particular for the construction of an ocean-going freighter with a cargo capacity of 10 000 t.

The success of Chinese shipbuilders in increasing the quality of production is also beyond all question, this being indissolubly connected with the introduction of new techniques and technical methods in the yards. Modern welding techniques have been introduced in large and medium-sized shipyards, and the amount of semi-automatic and automatic welding is continually on the increase. A start has been made with the use of optical instruments in assembly work for the installation of main engines and line shafting. Various welding jigs and tilting devices are used for ensuring the quality of welding work.

In the field of technical inspection, ultrasonic flaw detectors are used, and the quality of welds is tested by means of X-rays and gamma rays. Vibrographs are used for ascertaining the vibration conditions of ships under way. Compartments are tested for water-tightness by means of compressed air.

The extension of new techniques and technology has also resulted in a considerable reduction in the time required for the building of ships. In 1950, it took 150 days to design a transport vessel with a cargo capacity of 50 t and 207 days to build it; it took 120 days to design a river barge with a cargo capacity of 2000 t and 220 days to build it. In 1958, at the "Chiangnan" ("South of the River")* shipbuilding works, it took only 90 days to complete the design of a ship for coastal waters with a cargo capacity of 5000 t, while the

*in Shanghai - Ed.

ship took only 162 days to build. The time required for building a trawler with a 250 h. p. engine was 300 days in 1954, while the same type of ship was built at the "Chinhsin" ("The Deliverer") shipyard in only 82 days. At the "Chunghua ("China") shipyard, from the commencement of designing to the working trials of an ice breaker for the Huang Ho took 11 months. The launching time of a second ship at the Chiangnan ("South of the River") shipyard with a cargo capacity of 5000 t was 35 days; at the "Hutung" (?) shipyard, the launching time of a 300 t ship was reduced to 19 days. Similar progress is to be recorded also in the field of ship repairing. In 1958, the repair time of some types of ship was reduced by 88% compared with 1954.

In 1958, the Chinese People's Republic experienced an enormous increase in production. This also included shipbuilding. For the first time, the industry began to supply products, such as medium power diesels and ships of plastics and reinforced concrete.

In co-operation with engineering works, the shipyards made a large amount of forging and rolling equipment, including strip rolling mills, hydraulic presses and gas-holders.

Although in the past many small shipyards of local importance were scarcely able to cope even with the repair of ships, they have recently begun to build small tonnage vessels. Thus, for example, the Nanking shipyard by its own efforts has designed and built a tug with an 80 h. p. diesel; a shipyard in Wuch'ang has built a 500 h. p. tug; a shipyard in Foochow a 300 h. p. tug, the yard "Changhuapang" a 280 h. p. trawler. Many small yards which in the past undertook only the repair of machinery, such as for example in Hankow, Changsha and Harbin, now make marine diesels

and gas engines of medium and low power.

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[*] HIGH ROAD OF DISCOVERY

[+] M. Lavrentev

[**] Izvestiya, 29th October 1960

The paths of scientific discoveries from the moment conditions are created favourable to their conception right up to practical application of their results, are intricate and diverse.

Now that our country is leading the world in many branches of science and we are out to take a new big stride forward, it is worth while thinking about the paths of scientific discoveries and how to make them still broader.

As a rule, we cannot predict new discoveries. We can only say with a greater or lesser degree of probability where we can expect them. But to prevent this precious catch from slipping out of our hands we must set a sufficiently wide trap. We must develop science on as broad a scale as possible. We must devote our efforts not only to problems the urgency of which is already quite clear. We must also tackle problems of pure science. We must search for new phenomena in nature. We must hunt for explanations of things that are still a mystery. We must evolve theories to encompass the

[*] Translation prepared in the USSR - Ed.

[+] Academician, President of the Siberian Division of the Academy of Sciences of the USSR.

[**] Not held in LLU - Ed.

widest possible range of phenomena. Because it is precisely pure science that has enabled man to realize his most ambitious projects.

Imagine a new Rip van Winkle who fell asleep before the first World War. Looking at headings in scientific journals today he would most likely think he was hopelessly out of his wits or that the world around him had gone mad. Indeed, in the days before the first world war all talk about flights to the Moon was considered a sheer flight of the imagination, to say the least. Nineteenth-century philosophers proclaimed the Universe uncognizable. "We shall never see or know of what the Moon and Mars are made of" they claimed.

Even today there are many things in nature that we still know nothing about. But the new discoveries in the structure of the elements of matter, in the pattern of the living cell, and in super-high speeds, pressures and temperatures provide us with more and more levers for carrying out projects which even now seem fantastic.

Not to go far for an example, take the study of the deeper bowels of the earth, the probing of the earth's crust. This problem is not only of tremendous interest from the point of adding to our knowledge. It is likewise exceedingly important from the practical angle.

The waters and minerals that lie buried deep inside the earth represent inexhaustible resources. But we have literally only the most superficial notion of them.

We know fairly well what the earth's crust is like only at the top, at a depth of no more than seven or nine kilometres. By basing ourselves on this scanty and largely hypothetical data, we may, however, conjecture the truly stupendous potentialities we possess for augmenting the mineral resources we exploit by digging deep into

the places where they form. We could already make use of the earth's internal heat at places where the magma rises close to the surface, notably along the Kurile - Kamchatka range, in Japan and in the Cordilleras. After all, at Pauzhetka we are building an electric power station to generate electricity from the heat of a volcano. After all, all of Iceland employs hot geysers for heating!

We are gradually improving our technique of tunnelling deep into the earth. However, every new 100 metres down add incredible difficulties. Higher temperatures and longer shafts curl slender pipes and wreck ordinary drills. So far, as I have said, we cannot dig deeper than seven to nine kilometres. We need new ideas, new methods of approach. And we shall find them. The goal is so fascinating that success will justify the outlay in resources and effort.

While working on deep drilling and other major problems we must follow closely what physicists, chemists and experts in mechanics are doing. We must maintain close contact with scientists working in other fields. The history of science, especially over the last few decades, shows us what unexpected results seemingly "unnecessary" investigations have yielded, and the great and frequently decisive importance of direct contacts between scientists and engineers.

I feel it would be very useful if more books were written about all this. I shall merely confine myself to a few examples. Let me begin with the most abstract of sciences—mathematics.

Mathematical logic, with its strange problems and unexpected, at times, paradoxical ways of posing questions, was considered,

even till lately, a refined mental game. Now it is the basis for programmes that convert electronic computers into controlling machines, facilitating the automation of labour-consuming and hazardous processes. This "theory of mathematical puzzles and brainteasers" has found an application in the making of automatic machines. Eminent specialists used to say of the mathematical "theory of characters" that it provided a good illustration of a beautiful theory that would never be used in practice, but it is being used now. And what is more, in a major branch of chemistry. Academician I. M. Vinogradov's celebrated analytical method for the theory of numbers is now finding a host of applications in very important sections of the theory of probability in theoretical physics.

Astronomy was long considered an abstract science in principle, that is, if we discount its prediction of solar eclipses and its tidal theory. The discovery of helium was the first signal defeat this science inflicted on the proponents of such a view.

The study of solar activity is now extremely important both theoretically and practically since the processes taking place on the Sun affect the weather and radio communications. This luminary of ours is turning into a kind of laboratory, enabling us to investigate the behaviour of matter under conditions of super-high pressures and temperatures, which so far we cannot reproduce.

These examples show that our science owes its signal achievements precisely to the breadth of its horizons and the sweeping scale of its research. Every time seemingly hopelessly abstract scientific principles suddenly find practical application we have scientists able to catch on to the new trend and rapidly achieve definite results.

There are no useless discoveries! You cannot tell a scientist to stop his investigations because industry does not need them today. It will need them later. By scouting research which seems abstract today but which aims to unravel nature's secrets and reproduce nature's phenomena we stand to lose too much, because taming of the unknown forces of nature always follows their cognition.

That is why we need perspective and breadth in the organization of research.

Besides that we also need flexibility. This should not be understood only as extending the scope of research. We must be flexible, too, in establishing contacts with production and engineering, in promoting a practical application of scientific results.

Some scientists believe that the task of academic institutes is only to elaborate problems theoretically. Embodying scientific principles in operating machines is not a problem for science as such, but should be wholly the responsibility of designing offices. There have been many instances when this long ladder of intermediary rungs has resulted in mutual misunderstanding, the loss of precious time and, now and then, the failure of a good idea.

But there have been other cases when scientists have put their discoveries and methods at the disposal of industry, working jointly to obtain the desired results. There have been cases when through science seemingly merged with production it remained science for all that. A striking illustration of such inter-relations and the mutual enrichment of science, with its profound investigative approach to phenomena on the one hand, and engineering, with its broad potentialities for experiment on the other, is provided by the current effort to evolve a steam-gas turbine, for which the principles

were elaborated and calculated at the suggestion and under the guidance of Academician S. A. Kristianovich at our Siberian division. Now, industry - designing offices and factories - has joined in. Henceforth work will be done jointly.

Working in close collaboration with industry the staff of the Institute of Mining led by Corresponding Members N. A. Chinakal and T. F. Gorbachev and by Prof. B. V. Studinishnikov, has produced many remarkable machines, of which large batches have been manufactured. It has now extended the scope of its work. The wedding of its practical experience to the investigations conducted by our Siberian division's Institute of Hydrodynamics in the field of liquid jets has produced a hydrogun that will drastically increase the efficiency of hydromining in the coal industry. Staff members B. V. Voitsekhovskii and E. A. Antonov of the Institute of Hydrodynamics designed and made a model of such a gun, that successfully passed trials at coal pits.

Unfortunately, this positive experience of contact between science and industry is far from always there. It takes years sometimes to get scientific suggestions "put through." The more fundamental the suggestion, the harder it is at times to realize it. It is not only the conservatism of certain factories and ministries that is to blame. Since the country needs things uninterruptedly, we cannot keep changing production technologies. This is especially true of things that are fundamentally novel in principle and which do not fit in with the traditional pattern of some industries. In such cases we should not be afraid of setting up at the research institutes of the USSR Academy of Sciences our own designing offices with workshops large enough to reproduce the idea in an

operating model or even an operating machine. The Paton Institute of Electric Welding of the Ukrainian Academy of Sciences and the Institute of Precision Mechanics and Computing Techniques of the USSR Academy of Sciences provide an excellent illustration. We at the Siberian branch are trying to organize our institutes along these lines. We have even gone a step further by starting an experimental factory at our scientific centre.

I think it very important to work out a system for stimulating not only individual discoveries--which is done by the Lenin Prize Committee--but also the work of whole institutes. Thus large industrial establishments get a certain percentage from the profit and economy they yield to the state, which allows them not only to give bonuses to their best workers, but also to spend a lot on the expansion of production. It would probably be a good idea to work out an academy-wide or state-wide system for awarding prizes and bonuses to large groups of scientists or even entire research institutes.

Our Siberian division, which was founded three years ago by decision of the government, has all the conditions for it to assume, in the joint work of scientists of different cities, the place that the science of Siberia, that rapidly developing advance post of the seven-year plan, should lay claim to...

THE SEARCH FOR OIL IN THE CENTRAL REGIONS

*P. Antropov

+Ekonomicheskaya gazeta, 13th January 1961, p. 3

The central regions of the European part of the USSR are densely populated and highly industrialized. They have a greater shortage of fuels than many other parts of the country. It is sufficient to say that tens of millions of tons of coal and oil products are brought into this area every year over great distances. And although over seven years the share of gas and oil in the fuel-energy balance of the central regions has increased sharply, nevertheless in 1965 according to calculation it is planned to bring in about fifty million tons of coal. That is to say its share in the fuel balance will comprise no less than 40%.

Even after completion of the second gas pipeline from Stavropol' to Moscow and the gas pipeline from the Krasnodar region to Serpukhov the demand for natural gas in the towns and the industrial central regions over the next seven years will not be completely satisfied. It follows that there is an obvious need to develop new oil and gas bearing fields especially in the central regions of the

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*Minister of Geology and Conservation of Mineral Resources USSR

+LLU shelf mark: R019792. Holding: 4th July 1960 -

European part of the country. The prospect of oil and gas bearing fields here is bound up with the size of the Moscow (Central Russia) basin and the Saratov - Ryazan' depression.

The Moscow basin stretches in a wide belt from the south west to the north east, characterized by submergence of a crystalline bed to a depth of 3500 - 4000 metres. In the north west, this basin is terminated by the Baltic shield, in the south it is terminated by the Voronezh crystalline mountain range and in the south east by the submerged Tokmov anticline.

The area of the basin exceeds 500 000 square kilometres, the maximum length of the submerged part is 1200 kilometres, and the width is 400 - 420 kilometres. It encompasses the territory of Moscow, Smolensk, Vladimir, Ivanovo, Yaroslavl', Kostroma, the Vologda area and other neighbouring regions of the territories. To the south west it is joined to the Vyatok - Kamskoe basin located in the southern part of the Volga - Ural oil and gas-bearing province.

The Saratov - Ryazan' crest-shaped depression joins the Caspian oil and gas-bearing basin to the Moscow basin. It is 700 kilometres long and its width varies from 90 kilometres between Tambov and Pachelma station to 180 kilometres in the region of Ryazan' - Spas Klepiki. In the neighbourhood of this depression also the depth of the crystalline bed is not less than 3000 - 3500 metres.

Geological data accumulated for some time past give a basis for the study of the oil and gas-bearing potentialities of the vast territory of the Moscow basin and the Saratov - Ryazan' depression. These data confirm the markedly broken contour of the crystalline bed and of the associated upheaval in the sedimentary stratum.

It might be mentioned that until recently the territories of the central region of the European part of the USSR were considered by geologists to be relatively simple geological structures. In particular, it was believed that near the Moscow basin both edges were sloping and the layers in the middle of the zone were deposited horizontally. However, new data reveal a considerably more complex tectonic structure.

In the first place the central deepest zone is separated from the edges by sharply expressed structural conditions. They were formed as a result of regional fractures in the bed. These fractures occurring at intervals caused the upheaval of such big tectonic units as the Baltic shield, the Voronezh crystalline mountain range and the submerged Tokmov anticline, and they also resulted in the sinking of the land between the Moscow basin and the Saratov - Ryazan' depression.

These large submerged areas, by their structural character, recall the Dnepr - Donets basin in which there are exposed multiple formations of oil and gas, and this basin, as is generally known, originated as a result of longitudinal fractures in the bed.

Regarding the prospect for oil and gas exploration in the region of the Moscow basin and the Saratov - Ryazan' depression, one can mention the group of low Palaeozoic and Devonian marine deposits, similar in origin to the producing formations of the Volga - Ural region.

In the territory of the basin and the depression these deposits are mainly sand-clay rock in the lower strata, covered in the upper layers by carbonaceous and carbonate-clay deposits. Their formation at separate periods of time arose in conditions favourable

for the accumulation of organic material and subsequent conversion into oil and gas.

The thickness of these deposits varies widely. In the region of Moscow and Kalinin the total thickness of the lower Palaeozoic and Devonian formations is 1350 - 1400 metres; in the town of Soligalich the thickness of the discovered part attains 1670 metres. In the area of the Oka - Tsna upheaval occurring in the Ryazan' region, the depth increases considerably and apparently exceeds 2500 metres.

These deposits comprise, in general, sandy rocks possessing high porosity and permeability, and are therefore capable of accumulating a considerable quantity of oil and gas. In the Devonian section sandy rocks occur particularly in the region of the cities of Vologda and Lyubim where their total depth exceeds 150 metres. Thick blocks of sandstone, characterized by a large capacity, are also found in lower Palaeozoic deposits.

The presence of bituminous rock and the appearance of gas during the drilling of wells in the neighbourhood of Lyubim, Gorkii, Masolovo, Povapovo, Nelidovo, Smolensk and other places in the central regions of the European part of the USSR also confirms the presence of oil and gas.

The lower Palaeozoic sediments developed in the Moscow basin and the Saratov - Ryazan' depression, are characterized in a number of cases by an increased (up to 2% and more in the region of Povarovo and other places) content of organic material and combustible components in the gaseous phase of these deposits (up to 11 cm^3/l, say, in the region of Lyubim).

Recently during drilling in the region of Smolensk a thick layer

of lower Palaeozoic sandstone was discovered containing highly saline water. This contained bromine and iodine, and combustible gas was present. The latter contained 0.1-0.3% heavy petroleum hydrocarbons.

Among the Devonian deposits there are a number of layers containing bitumen, particularly in the vast territory of the upper Volga. These deposits have a characteristically high bitumen content of up to 2% in the rock. Chemical analysis shows that most of these bitumens are of the petroleum type. These were discovered in particular in wells at Nepeitsino, Lyubim, Shariny (?) and Gor'kii.

In conjunction with theoretical considerations these observations allow estimates to be made of the oil and gas-bearing prospects of the Moscow basin and of the Saratov - Ryazan' depression and particularly of the prospects of regions where the greatest submergence of the bed occurs and where thick Devonian and lower Palaeozoic deposits are recorded.

Meanwhile the geology of our central areas, particularly that concerning deep mineral resources, is little studied. It is sufficient to say that in the territory of the Moscow basin only 15 deep wells have hitherto been drilled, mainly in the western part of the area. In the most promising central part of the area around Ivanovo, Yaroslavl', Kostroma and Vologda, only four deep wells have been drilled, and of these not one was completed to the depth of the crystalline bed. On the average there is one deep well in an area greater than 35 000 km^2. Furthermore, at present, no geological maps having a scale of 1:200 000 are available for a considerable proportion of the territory of the European part of the USSR. In short, the deep mineral resources of this region

are studied less than those in parts of Siberia.

The explanation for this lies in the fact that in the past this region was under-rated as regards oil and gas-bearing potentiality. The consequences of this are apparent to this day. The department for the central regions and the North Caucasus of Glavgeologiya RSFSR (Main Geological Prospecting Administration) drills only single wells (depth not more than 1500 metres), and even then only at the expense of other financial resources. Geophysical work in the central region is developing slowly and in some places it is even being curtailed.

The Ministry of Geology and Conservation of Mineral Resources of the USSR, has examined the available geological and petroliferous evidence and considers that it is necessary to start a systematic and serious study of the oil and gas-bearing potentialities of the European part of the country. Requiring study is the depth of the structure of the Moscow basin and the north western part of the Saratov - Ryazan' depression, the character of the broken contour of the crystalline bed and the relation between this and the structural forms of the sedimentary deposit. It will be necessary to determine how the submerged parts of the basin and of the depression are connected to the edges of the formations, and to reveal the large structural members in the lower Palaeozoic and Devonian deposits, etc.

When the most promising regions have been established deep wells will be drilled to the crystalline bed. This work will be facilitated by seismic survey methods of refraction and reflection of waves through the regional contours intersecting the central part of the Moscow basin.

Simultaneously with this it is planned to carry out over the whole of the territory of the basin and the north western part of the Saratov - Ryazan' depression seismic sounding and electrical geophysical exploration on a scale of 1:500 000 to 1:200 000, and also to prepare the area and boundaries of the Lyubim and other regions for exploratory drilling for oil and gas.

The accomplishment of this work which has exceptionally important national economic value requires relatively small economic investment. The economic effect on the other hand can be very great. The Gosplan (State Planning Commission) of the USSR and the RSFSR are obliged separately to study the oil and gas-bearing prospects of the central areas of the European part of the USSR and to plan a vigorous increase in the volume of geological prospecting and exploratory work.

In order that this programme of work should be successfully completed within the next 2-3 years, it is essential to obtain the efficient help of the appropriate geological administration of the Sovnarkhozy (Councils of National Economy), the research institutes, district party and Soviet organizations.

The successful search for mineral resources in these districts is shown by the considerable contribution of geological prospectors in their work of utilizing the natural resources of our country and in improving the fuel-energy balance in the central regions of the European part of the USSR.

INFORMATION AND BIBLIOGRAPHICAL WORK OF TsNTB PO STROITEL'STVU I ARKHITEKTURE (CENTRAL SCIENTIFIC AND TECHNICAL LIBRARY FOR BUILDING AND ARCHITECTURE)

G. V. Il'chenko

*Sovetskaya bibliografiya, 1961 (6) 20-25

The extraordinary increase in scientific discovery in recent decades, and the huge output of literature which accompanies it, faces librarians of this country with fresh problems of improving scientific information and increasing its effectiveness. Under these circumstances an increasingly important part is played by VINITI (All-Union Institute of Scientific and Technical Information), the Gosudarstvennaya publichnaya nauchno-tekhnicheskaya biblioteka+(State Public Scientific and Technical Library), which is the coordination and methods centre for technical libraries, and all the branch scientific and technical libraries which supply specialists with information in their respective branches of knowledge.

In the field of building, the information and bibliographical work should be done by Tsentral'nyi institut nauchnoi i tekhnicheskoi informatsii Akademii stroitel'stva i arkhitektury SSSR (Central

*LLU shelf mark: R016417. Holding: 1959(1)-

+GPNTB - Ed.

Institute of Scientific and Technical Information of the Academy of Building and Architecture USSR). But the work of the Institute is not yet organized with sufficient precision and it is impossible for it to take in all the necessary foreign sources. Consequently the reference information given by the Institute is incomplete and fragmentary and does not include foreign building practice.

The whole of world literature on building is accounted for and information work is done on both home and foreign experience in this field by TsNTB po stroitel'stvu i arkhitekture Akademii stroitel'stva i arkhitektury SSSR* (Central Scientific and Technical Library for Building and Architecture of the Academy of Building and Architecture USSR). This library was formed by amalgamating the libraries of Akademiya stroitel'stva i arkhitektury SSSR (Academy of Building and Architecture of the USSR) and the libraries of a number of former ministries. It is now an information and bibliographical centre which supplies timely and complete information to building institutes and organizations on all the main achievements of building science and on advanced building methods in the Soviet Union and abroad.

The library has a very valuable reference and bibliographical apparatus with catalogues and card indexes for home and foreign literature since 1930. They amount to more than 400 000 cards.

The reference and bibliographical work of the library is developing in three directions: the supply of current bibliographical information about books and articles in Russian and foreign periodicals; the production of bulletins on particular topics and bibliographical reviews at the request of institutes; and the provision of a bibliographical service for engineers and technicians in research

*Further references to this library are abbreviated to TsNTB - Ed.

institutes and other establishments.

The organs of current bibliographical information published by TsNTB are the monthly "Bibliograficheskii ukazatel' tekushchei otechestvennoi literatury po stroitel'stvu i arkhitekture" (Bibliographic index of current Soviet literature on building and architecture) and "Bibliograficheskii ukazatel' tekushchei inostrannoi literatury po stroitel'stvu i arkhitekture" (Bibliographic index of current foreign literature on building and architecture). They were first published by the library in 1956 in conjunction with GNB (State Scientific Library) which had experience in the production of similar indexes. It is well known that GNB published from 1930 to 1953 "Novosti tekhnicheskoi literatury" (New technical literature) the series "Stroitel'naya promyshlennost'" (Building industry) in particular), and in 1954-1955 "Bibliograficheskii ukazatel' tekushchei literatury" (Bibliographic index of current literature). Thus the indexes published by TsNTB are actually a continuation of these publications of GNB in the field of building and building technology.

"Bibliograficheskii ukazatel' tekushchei otechestvennoi literatury po stroitel'stvu i arkhitekture" (Bibliographical index of current Soviet literature on building and architecture) contains information on books, journal articles, collected papers, "trudy" (transactions), "zapiski" (notes), authors' abstracts of theses, innovators' proposals, matter concerning exchange of experience, standards and norms, and also lists of bibliographical reviews completed by the library. The index of foreign literature covers books published abroad and articles from 400 foreign journals published in 18 languages. On the average each bibliographic index

includes between 1000 and 1500 descriptions of books and journal articles with accompanying notes. Both indexes are printed by letterpress in 600 to 700 copies and are distributed on a subscription basis.

A study of the utilization of these publications showed that they give timely and sufficiently full information about new literature to workers in research institutes and building organizations. Unfortunately not all building organizations yet possess indexes for 1956 to 1960.

The bibliographic indexes of current literature published by TsNTB are an informational aid for which no substitute exists. Their use for the selection of literature to meet the requests of specialists is difficult, because it takes considerable time. Actually if a specialist required literature on satellite towns for 1957 to 1960, he would have to look through 24 bibliographic indexes for a single year. In that case it would be better to refer to the bibliographic subject indexes published by the library. The library is planning advance publication of these indexes. A prospective list of bulletins of subjects for the following year is compiled from the collated plan for research work and from the requests of the institutes and branches of Akademiya stroitel'stva i arkhitektury SSSR (Academy of Building and Architecture USSR). Enquiries which are not covered by the topical bulletins are made the subjects of bibliographical reviews, the completion of which is made the responsibility of individual bibliographers. Thus according to the 1960 plan the library had to compile sixteen subject indexes and twenty-six written bibliographical reviews. In addition ten reviews were booked for institutes and branches of the Academy of Sciences.

Some of the bulletins compiled were: "Voprosy raionnoi planirovki" (Problems of regional planning), "Maloetazhnye zhilye zdaniya industrial'nogo tipa" (Dwellings of the factory-made type with few storeys), "Sovmeshchennye pokrytiya" (Composition flooring). Some of the bulletins compiled in 1959 were in the 1960 plan, for instance "Bol'sheproletnye prostranstvennye zhelezobetonnye konstruktsii" (Large-span three-dimensional reinforced concrete structures), "Kompleksnaya mekhanizatsiya i avtomatizatsiya stroitel'stva" (Integrated mechanization and automation of building) and the like.

Topical bulletins are compiled with regard to the dates for research projects, meetings, conferences and the like. For instance for "Vsesoyuznoe soveshchanie po gradostroitel'stvu" (All-Union conference on town-building) held from the 7th to 10th June 1960, the subject index, "Teoriya i praktika sovremennogo gradostroitel'stva v SSSR i za rubezhom" (Theory and practice of contemporary town-building and published as a separate book.

The work of compiling a topical bibliography begins with defining the group of questions to be included in the index and the time limit for the assistance required. The bibliographer makes a careful study of the content of the topic, referring to guides and manuals for higher educational establishments in that field, and to encyclopedias and reference books, and consults specialists.

After this preliminary stage of his work the bibliographer compiles a list of the main sections of the index, and agrees it with the specialists and other workers in the section to avoid unnecessary repetition of work. For instance the compiler of the bibliographical review, "Stroitel'stvo i rekonst'uktsiya tsementnykh

zavodov v SSSR i za rubezhom" (Construction and reconstruction of cement works in the USSR and abroad) learned that a worker in the information and bibliographical section had just completed a review on "Stroitel'stvo tsementnykh silosov i skladov" (Construction of cement silos and warehouses) which could be included in the new index as a sub-section.

Having defined the contents of the sections of the index, the bibliographer starts a search for materials. In the TsNTB the fullest sources are the catalogues, card indexes and bibliographic indexes of current literature, Soviet and foreign, for 1956 to 1960. Since the material is more compact and convenient to look through in the catalogues and card indexes, these are the sources which the compiler scans first. Then he looks through the appropriate sections of the bibliographic indexes of current literature for particular years, and also the most important foreign bibliographical publications: the annual of an American scientific society "Engineering Index", which publishes scientific achievements in different branches of industry in every country in the world, the monthly bulletin "Building Science Abstracts", published by the London scientific library for building*, and other foreign bibliographical publications.

After selecting all the necessary literature, the bibliographer proceeds to scan and classify it. When his work is finished he compiles a list of the sources he has used: catalogues, card indexes, bibliographical publications, Soviet and foreign books and periodicals.

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* Sic. Prepared at the Building Research Station and published by H. M. S. O., London. - Ed.

Topical bibliographies compiled by libraries help specialists to share in the main achievements in any building field, and by starting from them a research worker, scientist or engineer can make a real step forward. Topical bulletins are in great demand in building institutes and organizations, and are a considerable help in providing an enquiry and bibliographical service for specialist readers.

The kind of enquiry and bibliographical work done by TsNTB is the provision of a bibliographical service for borrowers and for readers in the reading room. The main group of the library's readers consists of workers in research institutes with a higher or middle technical education, each specializing in a restricted building field. The library is also made use of by engineers, technicians and scientists in planning establishments and industrial enterprises, students and teachers in higher educational establishments.

The subjects of readers' enquiries generally coincide with the requests of establishments for topical bibliographical reviews, but, written and oral reviews are carried out differently. To compile a written review, a bibliographer selects the necessary literature from catalogues, card indexes, monthly bibliographic indexes, abstract journals and Soviet and foreign bibliographical reference books, and gives a complete description of each book and article with notes. Oral enquiries are dealt with by the bibliographer on duty, who indicates to the reader the appropriate sections of catalogues, card indexes and the various bibliographical sources, from which the reader selects for himself the literature he needs. Before anything else the bibliographer clarifies the exact subject

of the enquiry, the object of the work and the level of technical education of the reader, and notes all this information in a special note book.

An accurate definition of the topic is particularly important for a rapid and correct answer to a reader's enquiry. Readers tend as a rule to formulate their enquiries briefly and give their topic either too wide or too narrow a title. For instance, reader B from Institut zhilishch (Institute of Dwellings) asked for material on building with large blocks. In conversation the bibliographer discovered that he was interested only in literature on wall panels.

Knowledge of the object of the work (whether it is intended for the examination of an industrial problem from all sides, for working out a project or merely for getting the accurate nomenclature of reinforced concrete components or for costing work and the like), and of the level of the technical education of the reader, enable the bibliographer to make the right selection and give the reader the fullest possible indication of all the sources in which he may find the literature he needs.

The bibliographer on duty gets considerable help in answering oral enquiries from topical bulletins, for instance: "Kompleksnaya mekhanizatsiya i avtomatizatsiya v stroit'stve: annotirovannyi ukazatel' literatury za 1953-1959 gg." (Integrated mechanization and automation in building. An annotated index of literature for 1953 to 1959.), Moscow 1959, "Promyshlennoe stroitel'stvo v SSSR i za rubezhom: annotirovannyi ukazatel' literatury za 1954-1958 (Fevral')" (Industrial building in the USSR and abroad. An annotated index of literature for 1954 to February 1958), Moscow 1958, "Sovremennoe gradostroitel'stvo: annotirovannyi

ukazatel' literatury za 1945-1957 gg. "(Contemporary town-building. An annotated index of literature for 1945 to 1957), Moscow 1958, "Teoriya in praktika sovremennogo grado-stroitel'stva v SSSR i za rubezhom: bibliograficheskii ukazatel' literatury (1957-1959 gg.)"(Theory and practice of contemporary town-building in the USSR and abroad. Bibliographical index of literature for 1957 to 1959), Moscow 1960, and others.

Besides providing an information and bibliographical service for readers, the library gives wide publicity to books on building and architecture, and to bibliographical publications. Every week an exhibit is made up of new books and Soviet and foreign periodicals. Topical exhibitions are constantly organized in the reading room and loan section on current topics and for conferences and meetings. Exhibitions were thus organized in 1960 on "Structural designs", "Mechanization and automation of building production", "New ideas in reinforced concrete", and "The All-Union conference on town-building". A special glass case in front of the entrance to the loan section is used to display the publications of the information and bibliography section of the library: bibliographical indexes of current literature, topical bulletins, and bibliographical reviews compiled at the request of establishments.

All the big libraries in the USSR, scientific, branch, republican, regional and provincial libraries, are now doing much work on the compilation of bibliographical indexes. There is a great deal of duplication in the work of libraries. This can be avoided by giving timely information about all bibliographical publications, both those actually published and those being compiled. The

Gosudarstvennaya biblioteka SSSR imeni V. I. Lenina ("Lenin" State Library of the USSR) publishes "Informatsionnyi ukazatel' bibliograficheskikh spiskov i kartotek, sostavlennykh bibliotekami Sovetskogo Soyuza" (Information index of bibliographical lists and card indexes compiled by libraries in the Soviet Union). But in the first place not all scientific and technical libraries provide timely information about bibliographical publications compiled by them, and in the second place the scanning of twelve issues of the index for a single year is naturally difficult. It would be very useful if sets of printed cards were published for indexes of literature that had been compiled and for bibliographical reviews that had been completed by libraries of the Soviet Union. The Gosudarstvennya biblioteka SSSR imeni V. I. Lenina, the GPNTB and the sectors of the network of special libraries of the Academy of Sciences of the USSR should establish a check on the information and bibliographical work of libraries.

Improvement in information and bibliographical work as a whole depends on correct organization of the compilation of bibliographical indexes. The current bibliographical publications of GPNTB - "Mashinostroenie" (Machine construction), "Metallurgiya i tekhnologiya metallov" (Metallurgy and technology of metals), "Energetika i elektropromyshlennost'" (Power and electrical industry), and "Gornaya promyshlennost'" (Mining industry) - and the current bibliography of TsNTB do in fact achieve one object. They effectively inform people about the latest discoveries of science and technology disclosed in newly published books, periodicals, transactions, patents and the like. But for the engineer and scientist it is important not only to know about the latest achievements of science, but also to be able to

share in the scientific experience of the last three to five years. This is the reason that there is such a large number of requests for the compilation of subject indexes and bibliographical reviews giving information on the literature of a given topic for a definite period of time.

Every library expends half the working time of its bibliographers on the production of subject indexes, and as a rule publishes them with a big time-lag. The organization of work on the compilation of bibliographical indexes and reviews and the method of producing them are approximately the same in all central branch libraries and in the GPNTB. Hence the introduction of changes in the technique of compiling indexes, if they made this laborious work easier and quicker, would make a considerable improvement in information work as a whole.

Let us consider, from the experience of TsNTB, whether we cannot simplify the process of compiling an index. The sources for finding the required materials are catalogues, card indexes, and the monthly bibliographic indexes of current literature for several years. In view of the fact that the bibliographical publications cover current literature even for the last weeks, while the putting of book and article cards in catalogues and card indexes is often 6 months in arrears, it is safe to say that the monthly bibliographic indexes give a much more complete picture of the literature on building and architecture. These indexes are first compiled as card indexes and are later typed. The top copy of the typescript is sent to the printers. The cards of the card index, from which the original of the index is typed, are sent for duplicating and are put in the classified catalogue of books

and the subject catalogue of journal articles. Consequently a bibliographer cannot make use of them for compiling indexes and is compelled to spend time transcribing many thousands of descriptions of the literature he needs from the monthly bibliographic indexes and catalogues.

If only a card index of current literature was maintained and was made up each month with cards for new accessions, the work of the bibliographer would be eased considerably. He could make up a bibliography of considerable size by selecting completed typed cards from the card index.

The proposed method of working with a card index of current literature could be used in any library, and this would save a considerable portion of the working time of bibliographers. Also, a card index produced during the compilation of the monthly bibliographical indexes could be a direct help towards the regular and timely publication of retrospective subject indexes which would be capable of satisfying very fully the enquiries of specialists and, in conjunction with current bibliography, of presenting exhaustive information on the literature of any branch of science. One need only look at the scheme of construction of the bibliographic index of current literature of TsNTB to be convinced that its main divisions have a topical character: "Ekonomika stroitel'stva i arkhitektury" (Economics of building and architecture), "Teoriya i istoriya arkhitektury i stroitel'noi tekhniki" (Theory and history of architecture and building technology), "Stroitel'naya mekhanika i teoriya sooruzhenii" (Building mechanics and theory of structures), "Stroitel'naya fizika" (Building physics), "Inzhenernaya geodeziya, geologiya, gidrogeologiya, gidrologiya"

(Engineers' geodesy, geology, hydrogeology and hydrology), "Grunty, osnovaniya i fundamenty" (Soils, footings and foundations), "Stroitel'nye konstruktsii (proektirovanie, raschet i vozvedenie)" (Building constructions (planning, estimating and erection)), "Stroitel'nye materialy i izdeliya" (Building materials and manufactured articles), "Organizatsiya i mekhanizatsiya stroitel'stva. Stroitel'nye mekhanizmy i instrumenty (Organization and mechanization of building. Building machinery and tools), "Sanitarnaya tekhnika i inzhenernoe oborudivanie" (Sanitary engineering and engineering equipment), "Gradostroitel'stvo. Raionnaya planirovka" (Town building. Regional planning), "Zdaniya i sooruzheniya" (Buildings and structures), "Zdaniya i sooruzheniya transporta i svyazi" (Buildings and structures for transport and communications), and "Gidravlika i gidrotekhnika" (Hydraulics and water engineering). In each section the material is further subdivided under subheadings. Consequently if the library were to publish each year subject indexes corresponding to this list with some additional detail in individual subsections, this would enable all the many kinds of requests from research and planning institutes and building organizations for topical bibliographical indexes to be satisfied in good time, and at the same time the compilation of the annual indexes would require no effort, since the constantly kept card index of current bibliography would be an ever-ready basis for publishing them.

I should like to touch again on the question of publicizing the bibliographical publications of central branch and scientific libraries. Unfortunately "Katalog gazet i zhurnalov dlya podpiski" (Catalogue of newspapers and journals for subscription) published

by Glavnoe upravlenie po rasprostranenie pechati (Chief Directorate for Distribution of the Press) informs its readers only of the bibliographical publications of Gosudarstvennaya biblioteka SSSR imeni V. I. Lenina (Lenin" State Library of the USSR). The GPNTB, in conjunction with the central branch libraries, could legitimately consider the problem of including in this catalogue information about the bibliographical publications of the largest branch and scientific libraries of this country with an indication of their subscription rates.

A MULTITUDE OF ORGANIZATIONS, BUT FEW CATALOGUES

*A. Entis

+Ekonomicheskaya gazeta, 7th January 1961, p. 3

Everybody seems to be aware of the immense importance of technical information about new machines, equipment, instruments and materials. At present, however, planning organizations find the level of this information completely unsatisfactory.

There are branch offices** of scientific and technical information under the direction of the GNTK (State Scientific and Technical Committee) of the Council of Ministers of the USSR. There are information departments also in a number of industrial branch design offices, under the sovnarkhozes (Councils of the National Economy), in factories and sales organizations. All of them issue or should issue catalogues and albums of the equipment being produced.

However, since there are no catalogues at all for numerous types of equipment and those which are in existence do not meet the requirements of planning engineers, many planning and design institutes also compile and issue albums of the equipment used in

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*Engineer at the All-Union State Institute "Giprokoks",

+LLU shelf mark: R019792. Holding: 4th July 1960 -

**for each branch of industry - Ed.

specific branches of industry. Moreover, all this is being done not according to a single system and plan but in dependence on the initiative of individual organizations. This is why now and again several catalogues are issued for certain kinds of equipment (for instance, for the electrical industry) whereas there are no catalogues at all for others.

We consider that there is a need for an organization of national status with the exclusive right to compile and issue catalogues and albums of the equipment being manufactured, of machines, instruments and engineering materials, and to publish the literature dealing with new manufacturing processes and high-output production methods.

This could be an All-Union State Institute, or a Central Directorate for Technical Information and Propaganda, which would incorporate the branch offices. All other information services, insofar as they serve this purpose, would either become branches of the Institute (or the Central Directorate) or act as link organizations between the organizations which are producing the new types of equipment and the Institute.

Practical information about new equipment and apparatus will be of assistance in a rapid application in the planning of industrial undertakings and will reduce the time lag between the end of scientific research and experimental work on new techniques and their introduction in mass production.

(The lack of up-to-date catalogues is again criticized in the story "Address Unknown" published in Ekonomicheskaya gazeta, 21st March 1961, p. 3. This describes the trials and tribulations of a works engineer in search of a compressed air engine in the course of this search he covers several thousand miles by air and spends hundreds of roubles, all because catalogues and registers of products are not available.

The position appears to be better in (say) the Czechoslovak Socialist Republic as can be seen from catalogues received in the LLU; these include:

(1) "Katalog textilních strojů" (catalogue of textile machinery), SNTL, Praha, 1959 (includes some details in English),

(2) "Strojirenský informator" (Engineering equipment manufacturers' register), SNTL, Praha, 1959, and

(3) "Obráběcí stroje 1961" (Machine tools 1961), SNTL, Praha, 1960.

In addition to these publications arrangements are in existence whereby a central loan collection of catalogues is organized at the Central Technical Library in Prague.

- Ed.)

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the D. S. I. R. Lending Library Unit, 20, Chester Terrace, London, N. W. 1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the Lending Library Unit.

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L. L. U. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicargo. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. Centre, L. L. U. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to 20, Chester Terrace, London, N. W. 1., and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from D. S. I. R., should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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RUSSIAN CASTINGS PRODUCTION

As part of its service to the foundry industry, the British Cast Iron Research Association has undertaken the publication of a cover-to-cover translation of the monthly Russian foundry journal Liteinoe proizvodstvo. It will appear under the title Russian Castings Production and will form part of the programme of Russian translations sponsored by the Department of Scientific and Industrial Research.

Liteinoe proizvodstvo is the leading Russian monthly for the foundryman; all aspects of castings production are covered, from raw materials through melting processes and equipment, moulding sands and methods, casting and fettling, to the service behaviour of the finished product.

While emphasis is placed on cast iron - grey, white, malleable, nodular and alloy - and steel castings, there are also articles dealing with non-ferrous and, particularly, light alloy castings.

A fresh approach is found in many of the articles on day-to-day foundry problems and the papers on new techniques and on metallurgical investigations by the numerous technical institutes in the Soviet Union are bound to interest foundry engineers and metallurgists. The journal is well illustrated and contains many detailed drawings of equipment.

Apart from the specific technical information to be gained, a

study of Russian Castings Production will enable the reader to build up a picture of the general development of the Russian foundry industry.

The first edition of Russian Castings Production will appear in May 1961, being the January 1961 issue of Liteinoe proizvodstvo. Publication will normally be four months after date of Russian issue. Russian Castings Production will contain approximately 56 pages printed letterpress, page size $11\frac{1}{4} \times 8\frac{1}{4}$ in., and it has an attractive two-colour cover.

Subscription rates for 12 issues are £10.10s.0d. in U.K. and $35 or £12.10s.0d. outside U.K. Single copies may be purchased at £1.10s.0d. in U.K. or $5 or £1.15s.0d. outside U.K.

All enquiries and orders should be addressed to the Publications Officer, British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham, England.

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New translations of recent scientific, technical, agricultural or medical articles in Russian of general interest may be supplied to requesting organizations which agree to edit a draft translation if called upon to do so. A free copy of the translation is given to the organization which edits it. The price per copy to others is not more than 2s. 6d. per page of the Russian original. Please use the form of request at the end of this list.

AVTOMATICHESKAYA SVARKA (Automatic Welding)

FRUMIN, I. I.
RTS 1779. Prevention of pores during submerged arc welding and weld surfacing
1956 (6) 1-30 72s. 6d

DOKLADY AKADEMII NAUK SSSR (Reports of the Academy of Sciences of the USSR)

BARSUKOV, V. L. & PAVLENKO, L. I.
RTS 1852. Distribution of tin in granitic rocks
Doklady AN SSSR
1956 109(3) 589-592 10s.

ENERGOMASHINOSTROENIE (Power Machine Construction)

KOSTENKO, A. V. et al.
RTS 1788. A study of nitrided 15Kh 11MF and 15Kh 12VMF steels after prolonged holding at 570°C.
1960 (6) 33-36 10s.

ENTOMOLOGICHESKOE OBOZRENIE (Entomological Review)

MURAGINA-KORENEVA, T. A.
RTS 1782. Ecology and systematics of the pelopiinae of the Utsha reservoir.
1. Procladius and Psilotanypus (Diptera, Tendipedodae).
1957 36 (2) 436-449 32s. 6d

INZHENERNO-FIZICHESKII ZHURNAL (Journal of Physical Engineering)

PREDVODITELEV, A. S.
RTS 1817. The rates of chemical reactions in turbulent streams (basic formulation of the theory).
1960 (11) 3-10 17s. 6d

IZV. VUZ: MATEMATIKA (Mathematics)

PETROV, A. Z. et. al.
RTS 1754. The classification of gravitational fields of general type by groups of motions. Part. 1.
1959 13(6) 118-130 30s.

KHIMICHESKIE VOLOKNA (Chemical Fibres)

PEREPELKIN, K. E.
RTS 1807. Kinetics of phase transitions in the dispersed system viscose-air
1959 (2) 48-50 7s. 6d

MATERIALY K POZNANYU FAUNY I FLORY SSSR, NOVAYA SERIYA, MOSK. O-VO ISPYT. PRIRODY: OTDEL. BOTANICHESKII.
(Contributions to knowledge of Flora & Fauna of U. S. S. R. New Series. Moscow Naturalists Society, Division of Botany)

PAVLOV, N. V.
RTS 1765. Plant resources of South Kazakstan.
1947 (3(11)) 110-145 80s.

MEKHANIZATSIYA I ELEKTRIFIKATSIYA SOTSIALISTICHESKOGO SEL'SKOGO KHOZYAISTVA
(Mechanization and Electrification of Socialist Agriculture)

MIKHAILOV, V. A. et al.
RTS 1752. Steering tractors by radio-control
1959 17(5) 51-53 7s. 6d

POCHVOVEDENIE (Soil Science)

KONONOVA, M. M.
RTS 1818 The humus of the main types of soil of the USSR, its nature and mode of formation.
1956 (3) 18-30 32s. 6d

RYBNOE KHOZYAISTVO (Fisheries)

SHABANOV, A. A. & IVASHEV, V. P.
RTS 1833. The VSM-2 machine for shaking nets.
1958 34(7) 32-34 7s. 6d

TROFIMOV, V. P.
RTS 1834. Trial application of comprehensive mechanization on board SRT-1044.
1959 35(9) 39-46 17s. 6d

SVAROCHNOE PROIZVODSTVO (Welding Industry)

PROKHOROV, N. N. & BOCHAI, M. P.
RTS 1831. Mechanical properties of aluminium alloys in the crystallization temperature range during welding.
1958 (2) 1-6 15s.

TEPLOENERGETIKA (Heat and Power Engineering)

MAMEDOV, A. M.
RTS 1847. Equation of state for heavy water (D_2O) from p-v-T experimental data.
1960 (9) 71-75 10s.

YUZA, Ya.
RTS 1827. Equation of state for saturated and superheated steam.
1960 (10) 80-89 25s.

RYZHKIN, V. Ya. & TAMBIEVA, I. N.
RTS 1828. Prospects of increasing the efficiency of large thermal power stations.
1960 (11) 9-15 17s. 6d

KAZAVCHINSKII, Ya. Z.
RTS 1829. Determination of the elementary functions in the equation of state for a real gas.
1960 (11) 59-64 12s. 6d

GURVICH, A. M. & MITOR, V. V.
RTS 1830. Radiating capacity of furnace installations.
1960 (11) 66-69 10s.

Below are listed recently translated articles dealing with research into steam properties and water treatment which have been announced separately in previous issues of the Bulletin:

VUKALOVICH, M. P. et al.
RTS 1538. Investigation of the thermal capacity of steam c_p up to 700 atm and 700°C.
1958 (7) 7-9 7s. 6d

SIROTA, A. M.
RTS 1539. Thermal capacity and enthalpy of steam at supercritical pressures.
1958 (7) 10-13 10s. 0d

SHEINDLIN, A. E. et al.
RTS 1540. Specific heat c_p of steam on the saturation line.
1958 (7) 13-17 12s. 6d

SILETSKII, V. S.
RTS 1541. Contribution to the problem of thermal (calorific) quantities of steam in the ideal gaseous state.
1958 (7) 18-21 10s. 0d.

PROKHOROV, F. G. & KURSKAYA, T. A.
RTS 1542. The optimum conditions for regenerating H-cationite filters with different cationites.
1958 (10) 35-42 20s. 0d

MAMET, A. P. & NIKOLAEV, A. V.
RTS 1543. An experiment on the preparation of a magnesite sorbent and the removal of silicate from water for feeding high pressure boilers.
1958 (10) 42-46 12s. 6d

KVYATKOVSKII, V. M. & BAULINA, A. I.
RTS 1544. Removal of silicates from water by magnesite sorbent developed by VODGEO Institute.
1958 (10) 46-51 12s. 6d

GRISHUK, I. K. et. al
RTS 1545. Influence of the dwell time of water in an accumulator tank on the efficiency of oxygen separation.
1958 (10) 51-53 7s. 6d

SHEINDLIN, A. E. et al.
RTS 1549. Reference values of specific heat c_p for water steam.
1959 (12) 80-83 10s. 0d.

TRUDY INSTITUTA METALLURGII I OBOGASHCHENIYA AN Kaz SSR (Transactions of the Institute of Metallurgy and concentration (of ores) of the Academy of Sciences of the Kazakh SSR)

KATKOV, Yu. A.
RTS 1816. Solubility of lead chloride in chloride solutions.
1959 1 27-30 10s.

UGOL' (Coal)

TARASOV, B. G.
RTS 1867. Characteristics of gas release in mine workings.
1960 (5) 27-31 12s. 6d

UKRAINSKII KHIMICHESKII ZHURNAL (Ukrainian Chemical Journal)

GORDON, B. E.
RTS 1761. Use of adsorption polarography in quality control
1956 22(2) 239-246 20s.

ZHURNAL FIZICHESKOI KHIMII (Journal of Physical Chemistry)

KUZNETSOV, A. Ya.
RTS 1835. On the problem of surface electrical conductivity of glasses in humid atmosphere.
1953 27(5) 657-661 12s. 6d

KALISH, T. V. & FRUMKIN, A. N.
RTS 1747. The effect of the adsorption of anions on the reduction of the $S_2O_8^{--}$ ion at a dropping cathode.
1954 28(3) 473-489 40s.

ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA im. D. I. MENDELEEVA (Journal of the D. I. Mendeleev All-Union Chemical Society)

PINES, B. Ya.
RTS 1787. The sintering and diffusional creep of metalloceramic bodies.
1960 5(2) 173-180 20s.

"Gidroturbostroenie" (Water Turbine Construction), edited by N. N. Kovalev.
Mashgiz, 1957. (LLU shelf No. R12379).

MALYSHEV, V. M. & MIKHEEV, V. I.
RTS 1791. Strength calculation of a water-turbine metallic spiral casing.
211-232 52s. 6d

"Rastitel'noe Syr'e Kavkaza" (Plant resources of the Caucasus),
Mosk. o-va ispyt. prirody. 1952.

GROSSHEIM, A. A.
RTS 1763. Chapter 1, Edible Plants.
13-47 80s.

Tiflotekhnicheskaya Laboratoriya Nauchno-Issledovatel'skogo Instituta Defektologii Akademii Pedagogicheskikh Nauk RSFSR. (Blind aids laboratory of the Scientific Research Institute of Defectology, Academy of Pedagogic Sciences, RSFSR).
Sverdlovsk. 1957

GERMANOV, M. M.
RTS 1823. Apparatus enabling ordinary printed text to be read by the blind (polyphonic and tactile),
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MEASURES FOR IMPROVING CO-ORDINATION OF SCIENTIFIC RESEARCH IN THE COUNTRY AND WORK OF THE ACADEMY OF SCIENCES OF THE USSR

Ekonomicheskaya gazeta, 12th April 1961, p. 1

The Central Committee of the CPSU and the USSR Council of Ministers have examined measures to improve the co-ordination of scientific research work in the country and the activities of the Academy of Sciences of the USSR.

The Central Committee of the CPSU and the Council of Ministers of the USSR note that in the development of Soviet science and technology, outstanding successes have been achieved. A vivid reflection of the scientific genius of the Soviet people and the high industrial-technical level in the country is provided by the historic achievements of Soviet science and technology.

In the Soviet Union a wide network of scientific research establishments and higher educational establishments has been set up. In them over 350 000 scientific workers are employed. In our country science has acquired a genuinely popular character. Its achievements are used extensively for the successful development of the national economy and to raise the material well-being and cultural level of working people.

Major successes in developing science have also been scored in the Union Republics; national cadres of scientific workers have grown up and a wide network of scientific research establishments

have been established.

Soviet scientists work selflessly for the good of our homeland. The whole Soviet people is rightly proud of their outstanding achievements.

The vast successes of science in our country have been achieved thanks to the limitless opportunities offered by the socialist system for the creative activity of scientists, thanks to the constant concern of the Communist Party and the Soviet Government and of the whole Soviet people for the development of science.

At the present time, when our country has entered the period of the comprehensive building of the Communist society, the role and the significance of science and technology become even greater. Soviet science and technology must, in the shortest possible time, advance to a leading position in the world in all decisive fields of science and technology.

In modern conditions, the further strengthening of theoretical research on the most important scientific problems, which are of great economic import, takes on particular significance, as do the bringing of science and production closer together and ensuring the further introduction of the results of work done in scientific research into the national economy of the USSR.

To ensure the carrying out of these most important tasks, it is essential to make a radical reorganization of the system of control in the work of scientific research institutions so as to do away with unnecessary duplication in scientific research.

At the present stage of development of science and technology a major task is the improvement of the system of long-range and current planning of scientific research and the co-ordination of research work.

The existing forms of control over the work of research institutions and the co-ordination of the planning of research calls for further improvement.

The Academy of Sciences of the USSR is called on to play a large part in carrying out the task facing Soviet science, and in modern conditions it must satisfy higher requirements in the control of the work of research institutions. The presence in the Academy of Sciences of the USSR of a large number of branch scientific institutions distracts it from the solution of the long-range problems of science and dissipates its strength and funds on working out numerous technical questions of a branch nature which could be dealt with more successfully in more specialized research institutes.

These shortcomings in the working of the Academy of Sciences of the USSR, and of other research institutions, arise to a considerable extent from the fact that there is no overall State body to co-ordinate scientific research. The absence of such a body leads in a number of cases to an unjustified splitting up of research, and to a non-rational utilization of scientific cadres and materials.

To ensure the necessary co-ordination in the work of the country's research institutions, the improvement of the planning of research, and the application of the discoveries of science and technology to the economy, and also to liquidate unnecessary duplication in the carrying out of scientific work, the Central Committee of the CPSU and the Council of Ministers of the USSR have recognized the need to create a State Committee of the Council of Ministers of the USSR for the Co-ordination of Research.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research is to be entrusted with the control of the work of research institutions on the carrying out of the main integrated scientific and technical problems, in accordance with the directives of the Party and Government, and with the co-ordination of the activity of the Academy of Sciences of the USSR, the Academies of Sciences of the Union Republics, the USSR Ministries and departments, in the carrying out of the major integrated scientific and technical work and also in ensuring continuity in research and the application of its results in the economy.

The State Committee of the Council of Ministers of the USSR must, in collaboration with Gosekonomsovet (the State Economic Council of the USSR) and the Gosplan SSSR (State Planning Committee of the USSR), on the basis of suggestions by the Councils of Ministers of Union Republics and USSR Ministries and departments, work out draft plans for research work and for the application of the discoveries of science and technology in production, ensure the development of all branches of the economy, and present these plans for confirmation by the Council of Ministers of the USSR.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research shall:

Exercise overall State control of the carrying out by all Ministries, departments and organizations of major research and the operative adoption of measures for the further application of the discoveries of science and technology in the economy,

prepare suggestions on major scientific and technical problems which are of particular economic significance, and also on problems arising from new discoveries and inventions,

prepare suggestions on problems concerning the supply to the country's research institutions of the necessary equipment, apparatus and instruments,

study and disseminate the discoveries of science and technology so that these discoveries may be used in the USSR National economy, and co-ordinate the international contacts of Ministries, departments and research organizations on problems of science and technology,

control scientific and technical information services in the country.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research will work out, together with the Gosplan SSSR, the Gosekonomsovet and the Ministry of Finance of the USSR and present to the Council of Ministers of the USSR, on the basis of draft plans by the Councils of Ministers of the Union Republics, Ministries and departments of the USSR, draft annual and long-term plans for the financing and material and technical equipment of research work, and also draft plans for capital investment in the development of science.

The co-ordination of research work which is not of a highly diversified nature will be carried out by Ministries, departments and Sovnarkhozes.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research is to be composed as follows: Chairman of the Committee - a Deputy Chairman of the USSR Council of Ministers; deputy chairmen and members of the Committee, and ex-officio members of the Committee: the Chairman of the State Committee of the Council of Ministers of the USSR for Automation and Machine-Building, the Chairman of the State

Committee of the Council of Ministers of the USSR for Chemistry, the President of the Academy of Sciences of the USSR, Deputy Chairman of the USSR State Economic Committee, Deputy Chairman of the Gosplan SSSR, the Minister of Higher and Secondary Special Education of the USSR and the Chairman of the Committee on Discoveries and Inventions attached to the Council of Ministers of the USSR.

A Learned Council of the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research will be formed to consider the major problems connected with the development of science and technology and to determine the main tendencies of the country's research, to include eminent scientists in the various branches of science and technology and the heads of the leading research institutions.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research is ordered to form, jointly with the Academy of Sciences of the USSR and the Union Republics, Ministries and departments concerned, Learned Councils on various problems which should include the major scientists and specialists.

In connection with the implementation of measures for reorganizing the system of control of the work of research institutions in the country and the creation of a State Committee of the Councils of Ministers of the USSR for the Co-ordination of Research, and in order to improve the working of the Academy of Sciences of the USSR, the Central Committee of the CPSU and the Council of Ministers of the USSR have recognized the need to concentrate the work of the Academy of Sciences of the USSR on the most promising and rapidly developing directions in science, furthering

the raising of the country's economic and cultural level.

The Academy of Sciences of the USSR must provide:

Scientific and methodological control of research in the natural sciences - physics, mathematics, chemistry, biology, the sciences concerned with the universe and the Earth - and the humanities, with a view to using the results of completed scientific work for the development of the economy and of culture,

give broader assistance to the Academies of Sciences of the Union Republics in the conduct of research, and co-ordinate the work of their departmental research institutes, of scientific institutions of the Academies of Sciences of the Union Republics and of higher educational establishments on theoretical problem of the natural sciences and the humanities,

maintain scientific contacts with scientific institutions abroad,

train scientific personnel.

In order to concentrate the work of the Academy of Sciences of the USSR on major research work in the natural sciences and humanities, and to improve the work of institutes of a * branch nature, on the suggestion of the Praesidium of the Academy of Sciences of the USSR, a number of institutes and other scientific institutions and also branches of the Academy of Sciences of the USSR are to be transferred from the Academy of Sciences of the USSR to the control of State Committees of the Council of Ministers of the USSR, Ministries, Departments and the RSFSR Council of Ministers. Scientific and methodological control of the branches will remain in the hands of the Academy of Sciences of the USSR.

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* subject - Ed.

The main task of the branches transferred to the control of the Council of Ministers of the RSFSR will be to give assistance to the Councils of Ministers of the Autonomous Republics and Sovnarkhozes in exploring the natural resources and developing the productive capacity of the regions concerned.

The State Committee of the Council of Ministers of the USSR for the Co-ordination of Research is entrusted with working out, jountly with the Councils of Ministers of the Union Republics, Ministries and Departments, measures for the further improvement of the work of research institutions. The Central Committee of the CPSU and the Council of Ministers of the USSR have entrusted the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research with drawing up a list of the chief research institutes in all branches of the national economy and a model charter for these institutes, and also to work out, in collaboration with Councils of Ministers of the Union Republics, Ministries and Departments, and present to the USSR Council of Ministers suggestions for improving control of the chief research institutes and concerning their subordination.

The organization of new research institutions irrespective of their subordination to departments will be carried out by agreement with the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research.

In consequence of the formation of the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research, the * State Scientific-Technical Committee of the Council of Ministers of the USSR is abolished. Organizations under the control of the State Scientific Technical Committee of the Council of

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*This was also known as GNTK - Ed.

Ministers of the USSR are transferred to the control of the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research.

The Councils of Ministers of the Union Republics and the State Committee of the Council of Ministers of the USSR for the Co-ordination of Research are entrusted with reorganizing the control of research institutions in the Union Republics, proceeding from the tasks and measures envisaged in existing resolutions.

The Central Committee of the CPSU and the Council of Ministers of the USSR consider that the most important taks of all research institutions is the further strengthening of research in all branches of science and technology, and, first and foremost, the expansion of research work on the basic scientific problems of great economic significance in order that Soviet science and technology may in a short space of time attain fresh and, even greater, successes.

THE COUNCIL OF NATIONAL ECONOMY AND ITS SCIENTIFIC BASE

*M. Markov

+Ekonomicheskaya gazeta, 29th January 1961, p. 2

In recent years, especially since the historic 20th Congress of the CPSU, the immense resources of the eastern regions have been rapidly placed at the disposal of the state economy. This is clearly seen from the example of our Irkutsk economic-administrative district. Never before has there been so much new building here. In only the three-and-a-half years since the reorganization of the administration of industry and construction, large enterprises have been launched, such as the Irkutsk hydro-electric power station and other power stations, a cement works, the first stage of an oil refinery, a ceramics plant in Angarsk, the "Pereval" mine undertaking, an experimental-industrial department for the first aluminium plant in Eastern Siberia, etc.

Still greater increases in production are envisaged by the end of the Seven-Year Plan. Production in 1965 should be three times higher than in 1958. A number of new branches of industry will be created.

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*Chairman, Irkutsk Council of National Economy (Sovarkhoz).

+NLL shelf mark: R019792. Holding: 4th July 1960 -

For successful completion of these tasks a scientific approach will be necessary. Consequently, a scientific base is required for the development of our industry. A complex scientific solution to the problems of distribution, planning and technology in the most important branches of industry in our district is especially important. As a rule, none of these problems is solved by ready-made technological schemes or by standard projects. The Angara region has its own peculiar problems. This applies to raw materials, especially minerals, to seismic and climatic conditions (eight and ten degree earthquakes, ground perpetually frozen, a sharp continental climate). It also applies to economics, determined on the one hand by the existence of large sources of cheap energy and large reserves of mineral wealth that is easily recoverable, and on the other hand by the distance between the region and the highly developed industrial centres and by a comparatively low population density.

The June Plenary Session of the Central Committee of the CPSU (1959) resolved "to take further steps to bring scientific-research workers, designers, and planning organizations into close contact with industry, to create the necessary conditions in Councils of National Economy for a comprehensive organization of scientific-research work, strengthening the scientific base which would support the Councils of National Economy in their work for technical progress".

Previously, the Irkutsk economic district had no sizeable scientific-research and planning base. True, it must be conceded that science has made a notable contribution to the study and development of the productive forces of the Angara region, particularly the Academy of Sciences of the USSR and its Eastern Siberian branch, a number of scientific-research institutes in Moscow, Leningrad,

Kiev and other cities. But now that the problems of the practical application of the scientific recommendations have grown, and now that the time has come to build of concrete and metal, along technological lines, those combines, factories envisaged in the projects, we cannot think of solving all the problems a long way from Irkutsk. Scientific-research and planning institutes are required on the spot.

Until the reorganization of the administration of industry and construction, the former ministries to a certain extent were able to coordinate and direct the activities of the institutes concerned with the various branches. Now our Council of National Economy, for instance, will have to maintain contact by agreements with more than one hundred scientific-research and planning organizations scattered over many thousands of kilometres in scores of towns throughout the country.

In the three-and-a-half years since the reorganization of the administration of industry and construction, the network of scientific-research and planning institutes in our economic district has been extended slightly. Up to the organization of the Council of National Economy there were the "Irgiredmet" (Irkutsk Institute of Rare Metals) and branches of Moscow Institutes - the "Giproneftmash" (State Scientific-Research and Design Institute for Oil Machinery), and three planning institutes ("Vostsibgipromakht", "Giprolestrans" and "Promstroiproekt").

Now an independent institute for the non-ore industry has been separated from the "Irgiredmet", and "Sibgiprobum",* the Institut mekhanizatsii i energetiki lesnoi promyshlennosti (Institute of

*Siberian State Institute for Design and Planning in the Pulp and Paper Industry - Ed.

Mechanization and Power of the Lumber Industry), and "Giprostroi-industriya"* have been created. The State Committee for Chemistry is forming a special design office for automation.

Scientific-research and planning institutes have already made a sizeable contribution to technical progress. The "Irgiredmet" collective in collaboration with workers from the head institute have designed an electric separator and introduced it at the "Yakutalmaz"+ trust and at the mine of the Lyangarsk-Samarkand Council of National Economy. Its creators, Ivoilov and Karnaukhov, workers at "Irgiredmet", have been presented with medals of the Exhibition of Achievements of the National Economy of the USSR. A mica extraction unit and an apparatus for film flotation of small diamonds have been designed and put into operation. At mine undertakings a new method developed by "Irgiredmet" for thermal breaking-up of rock is being successfully applied and work is being carried out on the production of aluminium alloys by an electrothermal method using local raw materials and regenerators.

Large-scale production plants and machinery for the chemical industry and new progressive methods have been developed by Irkutsk institutes ("NIIKhIMMash" the Scientific-Research and Design Institute for Chemical Machinery and "Giproneftemash") including a semi-continuous unit for production of "Lavsan" synthetic resin and the first low-charging centrifuges to be designed in the USSR, etc.

However, the scientific-research and planning base in our economic district far from satisfies the demands of a rapidly growing industry.

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*State Institute for the Design and Planning for the Building and Construction Industry - Ed.

+Yakut Diamond Trust - Ed.

We consider that to a great extent this gap will be filled at the expense of the help which has been given us by the institutes and laboratories of the Irkutsk Scientific Centre of the Siberian Department of the Academy of Sciences of the USSR. At this moment we are discussing an agreement with them on a plan for future scientific research. But the academic institutes will not be able to decide urgent problems on research and planning of new industries.

Take, for instance, such problems as machinery designing, particularly mining equipment, suitable for eastern Siberian conditions. The state economy is suffering heavy losses through breakdowns and machinery shut-down at low temperatures. There have been serious accidents in many mine undertakings in Eastern Siberia because the low temperature conditions in which machinery must operate had not been allowed for.

Until now the bureaux and factory planners have been "battling" with the cold brittleness of the machinery they have produced by means of requests, displayed on the rating plates, for shut-down of work at temperatures of 30°C.

The establishment of a Scientific-Research Institute of Mining Machinery would enable scientific recommendations to be realized and research to be extended still further. This is vital for such large undertakings as the Noril'sk concentration plant, the coal sections of the Cherembass and Krasnoyarsk region, the "Yakutalmaz", "Lenzoloto"* and "Yakutzoloto"+ trusts and many others. Despite the necessity of setting up such an institute, Gosplan (State Planning Commission of the USSR) has rejected our proposals.

Naturally, in itself the establishment of new institutes is a difficult task. At the July 1960 Plenary Session of the Central

*Lena Gold Trust - Ed.
+Yakut Gold Trust - Ed.

Committee of the CPSU our economic district was justly criticized for delays in creating a material base for the scientific-research and planning institutes. The Council of National Economy took certain steps. The working area was extended for a number of institutes, living quarters were taken over for workers in the scientific-research and planning institutes, new working and living quarters were built for "Irgiredmet" and "NIIKhIMMash". Two new laboratories were built for "Irgiredmet": for light metals metallurgy and automation and mechanization.

We are well aware that there remains much to be done to overcome the serious difficulties in establishing normal working conditions for our institutes.

In our view there is still one basic problem which has yet to be solved - the coordination of scientific research. For us the basic problem is that of light metals metallurgy (particularly aluminium), ferrous metallurgy (full supplies of the necessary raw material for the future Taishetsk metallurgical combine), improvement in the technical and economical factors of cement production and a wide range of problems connected with the chemical and petrochemical industries. Some scientific-research and planning institutes in our district which are called upon to deal with these matters are responsible to the Council of National Economy, others to VSNKh (the Supreme Council of National Economy), and a third group to the state Committee of the Council of Ministers of the USSR. Such a dispersion of management will inevitably limit the use to which the potentialities of research and planning organizations may be put.

There is yet another burning question. It is well known that scientific research is effective only then when the conclusions and recommendations are verified under factory conditions and the

machinery and equipment designed is built and works reliably. For this the research and planning organizations need workshops and pilot plants. Considering the prospects of extensive development in the Angara region of light, non-ferrous and ferrous metallurgy, we feel that the time has come to establish an experimental metallurgical plant in Eastern Siberia - preferably in Irkutsk. It would be convenient, it seems, to build this plant on the site of the Irkutsk aluminium plant in Shelekhov. We are counting on support for this from the State Planning Commission of the RSFSR and the Supreme Council of National Economy.

The country's industry is gaining a strong position in the Angara region. The establishment here of a reliable scientific-research and planning base will help to increase the pace and enable the resources of this rich area to be put to greater use for the benefit of the Motherland.

The reorganization of the administration of industry and construction referred to above took place in May 1957 when 141 All-Union, Union-Republican and Republican Ministries were abolished and control passed to Councils of National Economy in 104 economic administrative areas. According to one report 72% of the gross industrial production of the USSR is now under the direct control of these Councils of which there were (in 1958) 68 in the RSFSR, 11 in the Ukrainian SSR, 9 in the Kazakh SSR, 5 in the Uzbek SSR, and one each in the other Union Republics. - Ed.

[*] FIRST INVESTIGATIONS IN THE USSR ON THE CONTROL OF EVAPORATION

[+] I. V. Egiazarov

[**] Izvestiya Akademii nauk Armyanskoi SSR, seriya tekhnicheskikh nauk, 1960 (6) 11 - 13

In the USSR, in addition to the published investigations conducted exclusively in laboratories during the period 1933-40, investigations on the practical control of evaporation from water surfaces were begun in 1960.

On the initiative of the Ministry of Agriculture of the USSR, of VASKhNIL ("V. I. Lenin" All-Union Academy of Agricultural Sciences) and of the Permanent Commission on Surface Active Substances, and with the participation of the Soviet Committee on Irrigation and Drainage (Academician A. N. Askochenskii), the laboratories of the Institute of Physical Chemistry of the Academy of Sciences of the USSR (Professor Dr. A. A. Trapeznikov), of the Institute of Organic Chemistry (A. D. Petrov, Corresponding Member of the Academy of Sciences of the USSR), of the VNIIGiM (All-Union Scientific Research Institute of Hydraulic Engineering and Land Reclamation - V. S. Makarova) and of the Valdai Hydrological Research Laboratory of the State Hydrological Institute of the

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[*] Extract from survey of published literature in this field. - Ed.

[+] Institut gidravliki i energetiki, AN Armyanskoi SSR

[**] NLL shelf mark: R00732. Holding: 1957(1)-

GUGMS (Main Administration of the Hydrometeorological Service) (V. I. Kuznetsov) have been enlisted to take part in these investigations.

Laboratory investigations on 12 fatty alcohols of natural and synthetic origin and with hexadecanol obtained from the USA have been begun in Moscow.

Parallel investigations are being conducted on evaporators and on a stretch of water 100m^2 in area on the Valdai plateau.

A mechanical apparatus for detecting and determining the surface tension of the film (Trapeznikov's and Ogarev's methods), which is suitable for use under windless conditions, has been built. Work is in progress on designing an apparatus for use under natural conditions when the water surface is agitated.

Experiments conducted in 1960 on the Valdai plateau gave interesting characteristics for the twelve chemicals under investigation (see article by V. S. Makarova, scientific worker of VNIIGiM, in Trudy Gidrologicheskogo instituta, 1961). However, these must be regarded as preliminary, instructional, experiments, since we have not yet familiarized ourselves with all that has been achieved abroad during the past 8 years.

As a result of repeated suggestions by the present writer, beginning in 1958 (at the scientific council of the VEnI (Water Power Institute) of the Armenian Academy of Sciences, at the meetings of the Department of Technical Sciences and of the Presidium of the Academy), in 1960 the Institute of Hydraulics and Power Engineering of the Academy of Sciences of the Armenian SSR (formerly VEnI) began preparing for investigations on evaporators and on two stretches of water 0.4 and 0.2km^2 in area (lagoon lakes) on the eastern shore of lake Sevan (Ardanish), i.e. under natural riparian

conditions of a lake. The water and heat balance of these lakes is being studied. The chemicals for the experiments were kindly provided by VNIIGiM. In order to coordinate these experiments and those on the Valdai plateau, the Institute detailed two workers to assist in the experiments there, and in the autumn of 1960 V. S. Makarova, scientific worker of VNIIGiM, who spared no effort in carrying out the scientific liaison work, assisted and participated in experiments conducted in Armenia with six of the chemicals referred to above.

Apart from this, an artificial lake 6600m^2 in area (50 m long and 1.5 m deep) has been created at the great open-air laboratory of the Institute at Norka, which was organized in 1951 by the present author for wave research below the Kuibyshev hydro-electric power station. This artificial lake is provided with a wave producer and is intended for experiments with a protective film, against evaporation, where the water surface is agitated to a wave height of up to 30 cm.

A very important factor is that this laboratory possesses a powerful aeroplane propeller apparatus with a capacity of 820 h. p. (LI-2 aircraft) for experiments on the blowing-away and drift of the film. The experiments conducted in 1960 in Armenia are, of course, likewise only of a preparatory and instructional nature. Here, too, we must assimilate what has already been achieved abroad

A study of the experimental work done abroad, summarized in our two communications, shows that investigations in 1961 should follow three lines.

1. Research on Soviet chemicals for producing a protective film and for checking it under natural conditions.

2. Investigations into an uninterrupted supply of suspension (cetyl alcohol) when the water surface is agitated by the wind and when the wind blows the film away. Determination of the degree of cover of the water surface by the film and of the operating conditions ensuring an increase in the degree of cover.

3. Determination of Soviet conditions of production of high-quality industrial fatty alcohols and of the conditions for reducing the cost of these products by manufacturing them in commercial quantities from synthetic petroleum products.

An All-Union Committee for Control of Evaporation should be set up in accordance with the provisions of the Decision of the Council of Ministers of the USSR of 22nd April 1960 No. 425 concerning "Measures for regulating the exploitation and the extension of protection of the water resources of the USSR".

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148 literature references (nearly all to non-USSR literature) are given in Izvestiya AN Armyanskoi SSR, seriya tekhnicheskikh nauk, 1960 (3) and ibid, 1960 (6) 16-17. - Ed.

A CONVEYOR INSTEAD OF A TRAIN

*L. Mataradze

+Ekonomicheskaya gazeta, 1st February 1961, p. 2

The volume of goods carried by the railways in the USSR is growing from year to year. The contact between economic regions is becoming stronger and closer all the time. Machines, raw material and agricultural produce make thousand-mile journeys which are often economically unjustified.

Frequently, however, a load travels only a short distance to its destination - a matter of 10 to 20 km. Such short and nearly always one-way journeys are very expensive and require large reserves of rolling stock. For example, the cost price of conveying ore, coal and building materials distances under 30 km is two to seven times greater than the cost price for medium-distance journeys.

In spite of this, manufacturers and even planners do not take into consideration the enormous possibilities of main-line conveyor transport which is already in wide use in a number of countries.

Main-line conveyors are the most efficient means of transporting bulk freight (coal, ore, grain, sand, mineral fertilizers,etc.) over short distances.

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*Engineer, "Vorkutaugol'" Combine.

+NLL shelf mark: R019792. Holding: 4th July 1960-

Even the use of existing conveyors intended for internal use by enterprises cuts costs considerably on the conveyance of goods for distances up to 15 km.

Main-line conveyors could be successfully employed, for example, for the following transportations: limestone from the Studenov Quarry to the sintering works of the Novo-Lipetsk Metallurgical Works; raw material from the Novo-Krivoi-Rog Mining and Ore-Dressing Combine to the local metallurgical works; coal from the pits to the Karaganda Metallurgical Works, and so on.

In this case it should be borne in mind that a 15-km conveyor installation will replace a railway at least 30 km in length. The point is that conveyors are able to overcome considerably steeper inclines (300-400 °/oo and such obstacles as roads, ravines and streams. There is no need to build bridges. In addition to this, conveyors are characterized by their high productivity - up to 20 000 t/h - and the process of transportation can be fully automated.

It is particularly advantageous to use conveyors under the conditions of the North and other regions which have an insufficiently developed network of roads, with severe climatic conditions and complex topography. The delivery of Vorkuta coal to the Murmansk and Archangel Oblast's and to other northern districts is accompanied at present by great difficulties and works out extremely expensive. All in all, the coal travels up to 1200 km: first of all by rail, then, after transhipment at the port of Pechora, along the Pechora River to the port of Nar'yan-Mar, where it is again trans-shipped, this time into sea-going vessels.

In February of last year, in the Council of National Economy of the Komi ASSR, the possible versions of hauling the Vorkuta coal

were discussed. It was apparent that the construction of a railway to the region of the mouth of the Karataikha or to Khabarov-port would involve exorbitantly high capital investment. Moreover, a railway of this sort would not find a sufficient flow of return traffic. However, main-line conveyor-transport according to the direct freight version of "pit to sea port" would reduce the haulage distance by eight times, cut out both the trans-shipments and lower the cost price of the operation.

Two factors hinder the accomplishment of this as well as of many other projects. First of all, our industry produces few powerful conveyor installations (type KRU-900). Secondly, certain theoretical problems connected with the use of conveyors under various conditions remain to be solved.

Thus, the problem has not yet been studied as to how efficient is the use of conveyor lines for the transportation of loads over distances greater than 200 km.

It appears to us that a cardinal solution to this problem would only be possible if the efforts of individual specialists, institutes and design bureaux were directed by a single coordinating centre which could be set up, say, under the Komitet po avtomatizatsii i mashinostroeniyu (Committee for Automation and Machine Building). It would also be expedient to organize in addition a Chief Directorate of Main-line Conveyor Transport and to subordinate several factories to it. This would enable at least three main-line conveyor systems to be constructed in 1962-1963; for example, at Vorkuta, in the Krivoi Rog area and in the region of the Kursk Magnetic Anomaly.

It is self-evident that allied branches of industry such as the technical rubber, chemical, metallurgical and instrument-building

industries should also be included in this matter. It is particularly important to furnish the machine builders with a high-strength inexpensive conveyor belt, the expenditure on which would amount to 30-50% of the cost of the installation and 30-40% of the operating costs. The demand for such a conveyor belt is hardly being satisfied at all at present.

True, it cannot be said that this problem is not under discussion. The NII rezinovoi promyshlennosti (Scientific Research Institute of the Rubber Industry) conducts meetings several times a year. But as soon as the conversation gets round to the quantity and production dates of high-strength belting, dates are quoted which in no way correspond to the tasks of technical progress. Apparently it is time for the Gosplan SSSR (State Planning Commission of the USSR) to say its decisive word. In particular, it would be possible to obtain additional production capacity if belts with cotton belting would be taken off the production list. Much natural rubber is consumed on these belts, and after all, they belong to the equipment of yesterday.

Help in organizing the production of high-strength rubber and wire-rope belts, which are the most suitable for main-line conveyors, should also be given by the metallurgists. The supply of especially strong wire ropes would enable the drums* of the conveyors to be reduced by approximately twice and the volume of metal and the cost to be sharply lowered.

The following should also be noted. We are sometimes over attracted by the construction of covered and heated galleries for our conveyor lines. However, experience gained in erecting electric power stations in the southern regions of the country, where the majority of assemblies remains open to the sky, proves conclusively

*Sic. Probably belt idlers - Ed.

that covered galleries for main-line conveyor systems are by no means always necessary. The cost of a conveyor when a gallery is built for it as well increases two or three times. This also distorts the picture of the enormous efficiency of main-line conveyor transport.

At the present time only a few enthusiasts are working in the quiet of their design bureaux on the setting-up of main-line conveyor systems. They firmly believe that in the near future a dense network of such conveyors will cover the country's territory. In order to bring this time nearer, the help of many government organizations is required.

NEW INSTITUTE FOR PATENT APPRAISAL

Anon.

Ekonomicheskaya gazeta, 16th March 1961, p. 4

The Vsesoyuznyi nauchno-issledovatel'skii institut patentnoi ekspertizy (All-Union Scientific Research Institute for the Appraisal of Patents) has now been established under the Committee for Inventions.

In the past novelty in the invention was assessed by external experts; practice over the past few years has shown, however, that they did not always carry out their obligations satisfactorily, allowing errors.

The Institute will carefully select inventions for introduction in the national economy and help design and planning organizations in the expeditions exploitation of the home and foreign patent literature.

REPORTS ON VISITS

The following published and unpublished reports have been received in the D.S.I.R. Lending Library Unit, 20, Chester Terrace, London, N.W.1. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar reports they may have made in the Lending Library Unit.

INLAND NAVIGATION

HARTUNG, F.: "Die technische Entwicklung der Binnenschiffahrt in Russland". Unpublished report by author at Bundesverkehrsministerium, Bonn, W. Germany.
(Report of study tour by 10-men team from the German Federal Republic to the USSR between 14th September and 7th October 1960. The team visited in Moscow the Ministry of Inland Navigation of the USSR, the Central Scientific Research Institute for Economics and Management of Inland Waterways, and the State Institute for Planning of Inland Waterways Transport; other places visited include the river-station Moscow-Khimki, locks on the Moscow river-Volga canal, the ports of Ulyanovsk (Volga) and Stavropol, a ship repair yard in Stavropol, the hydroelectric power station at Kuibyshev, the floating Inland Waterways Exhibition of the Ministry of Inland Navigation, the port of Volzhsk and a hydroelectric power station under construction, the port

and shipyards of the Volga reservoir at Stalingrad, lock No. 15 on the Volga-Don canal, and the port of Rostov-on-Don. At Kiev the "Lenin's Smithy" shipyard was visited, in Leningrad the Institute of Waterways Transport, in Irkutsk the Angara Reservoir. A note on a tour by US rivermen of the USSR is appended.)

NLL shelf mark: V 115

L. L. U. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $ 16.00.

In addition to the accessions from the S. L. A. Centre, L. L. U. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to 20, Chester Terrace, London, N. W. 1., and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from D. S. I. R. should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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SOME PROBLEMS IN PLANNING THE NEW TECHNOLOGY

(The Seven Year Plan and Technical Progress)

*A. Kostousov

+Pravda, 5th May 1961, p.4

The historic flight of the Soviet space-ship "Vostok" with the cosmonaut Yuri Alekseevich Gagarin on board, has demonstrated to the whole world the heights attained by science and technology in our country. This great scientific achievement - the world's first manned flight in space - was realized as a result of the purposeful and united efforts of specialists in many branches: mathematicians, physicists, engineers, metallurgists, radio-electronic engineers, chemists, biologists and many others. The successful solution of this historical scientific and technical task - emphasizes once again what enormous importance attaches to the concentration of effort of scientists and specialists on such major scientific and technical problems and on the speediest possible application of the results of scientific research and project and development work in practice, that is, in production.

In recent years there has been an appreciable improvement in the practice of current and prospective planning of the principal

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*Chairman of the State Committee of the Council of Ministers of the USSR on Automation and Machine Building

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tasks involved in working out and applying new technology. The 1961 plan for new technology was worked out simultaneously with the production plan and greater attention was devoted to getting out the first batches of new mass-production machines. Forty-two leading institutes of the State Committee of the Council of Ministers of the USSR on Automation and Machine Building studied the plans of more than two thousand scientific research and design and development organizations. As a result, 1860 of these projects were rejected: 900 of these duplicated each other, while 500 had already been developed by other organizations. This study therefore brought a saving to our industry of more than forty million roubles at the new rate*. This amount and - most important of all - the creative efforts of the scientific workers involved, have been thus directed into more useful channels.

At the same time, the work on the planning of new technology, including the activity of the Committee for Automation and Machine Building, still reveals a number of serious shortcomings.

To begin with, a number of urgent measures for technical progress failed to be included in the national economic plan for 1960. Thus, the serial production of 47 new machines for the textile industry was envisaged; in fact, however, the production programmes of the factories made provision only for 22. In particular, for the Russian Federation, only 16 machines out of 36 were included in the plan. Instead of twelve machines the Ivanovo Sovnarkhoz (Council of National Economy) put into production - two. The situation is similar in the Ukraine, Uzbekistan and Tadzhikistan. In the coal industry, 233 coal faces were to have been completely mechanized last year. This

* £1 = 2.52 roubles - Ed.

involved the manufacture of 275 complete units of machinery. However, the Gosplany (State Planning Committees) of the RSFSR and the Ukrainian SSR only made provision for the production of 185 units while, in actual fact, only 145 were produced.

In the plans of the Union Republics for 1960 there was often inadequate coordination between the production of new machines and their equipment with necessary parts and accessories, between the production plan and the plan for the introduction of the new technology. Thus, the Kolyushchenko Works of the Chelyabinsk Sovnarkhoz was required to produce, in the fourth quarter of the year, a wheel-type, self-propelled scraper "D-392" on a uniaxial tractor base. In fact, this is still not in production. Similar discrepancies are not uncommon in the plan for this year too. For example, the Leningrad Sovarkhoz was to produce the prototype of a rotary axial flow compressor for carbon dioxide. Meanwhile, the manufacture of the turbine for this compressor is only planned for 1962.

Up to the present the system of drawing up plans for the introduction of new techniques has itself not been adequately worked out. There is no clear demarcation between the plans of the manufacturing enterprises, the Sovnarkhozes and the Republics. There is no carefully thought out system for the planning of work on mechanization and automation of production for the different branches of industry. The plans now being drawn up do not always clearly indicate how it is intended to raise the level of technical equipment in this or that branch of the national economy or what economic effect will be achieved. Cases occur where relatively unimportant projects are included in the national economic plan, while really large-scale measures are neglected.

It is abnormal that the majority of measures for the development and introduction of new machines are usually planned for the last quarter of the year. Thus, for the current year it is envisaged that 42% of experimental prototypes will be developed and produced in the fourth quarter, 27% in the third, and in the first quarter - only 5.7%.

Such an abnormal situation is partly explained by the fact that the development of the necessary technical documentation is lagging behind. It is essential, not only to speed up the preparation of technical documentation for articles included in the plan for this year, but also to determine as early as possible which new machines will be included in the plan for 1962, in order to ensure the preparation, in good time, of the technical documentation involved.

Next year's national economic plan must include only the really important products and technical measures, concentrating attention above all on the development of model technological solutions and means of mechanization and automation. Especial importance attaches to the development of basic models of machines and equipment from the ranges of designs prepared. This has frequently been stated in the columns of Pravda. The production of a range of machines of proved technical usefulness forms an enormous reserve of machine building, permitting the fullest utilization of the superiority of a socialist planned economy.

It must also be stated that individual measures of the plan for new techniques are not always in accord with the state plans of the Union Republics and the Sovnarkhozes. Thus, in last year's plan, the "Uralelektroapparat" Works was supposed to develop basic types of oil circuit breakers. However, it soon transpired that the factory was not in a position to make these as it did not have the necessary

testing facilities. The Penza Accessories Factory was entrusted this year with the manufacture of stop-cocks for ball-valves with pneumo-hydraulic operation and remote control. It turned out that the dimensions of these stop-cocks were such that it was impossible to make them at this factory.

It often happens that the production of experimental models of new machines is planned in isolation from the planning of their mass production. Experimental models often grow obsolete without ever having reached the stage of mass production. Technology makes rapid progress and a delay of two or three years in putting a new machine into production means that it has had time to become obsolete and that there is therefore no longer any purpose in producing it.

A regrettable case of this nature occurred at the Klimov Machine Building Works which in 1956 produced an experimental model of an automatic double-shuttle loom "AT2-120 ShL". For three years the factory failed to commence serial production of this machine and now a new, more advanced type has been developed which will begin to be produced in series in the current year.

Planning organizations often withdraw obsolete machines from production though the output of the new ones is not yet assured. Thus the "Penztekstil'mash" Works ceased production of a combing machine, although the design of the new, more highly perfected model was not yet sufficiently advanced. The "Ivtekmash" Works, of the Ivanovo Sovnarkhoz, is to discontinue production this year of spin drying machines, though the modernized version is not yet ready.

Owing to inaccurate planning, drastic changes sometimes have to be belatedly made to already approved plans. Last year the Gosplan of the USSR was compelled, owing to the insistence of the Union Republics, to introduce important correctives into the plan for the

production of the first batches of new machines. Such errors must not be permitted in the development of the plan for new techniques for next year.

A series of measures has recently been taken to improve the practice of introducing new technology. Some scientific research institutes are being put on a self-supporting* basis and their responsibility for applying the results of their work to production is being raised. It has been decided to put an end to the incorrect practice whereby factories are supplied with new equipment without the essential preliminary testing and proving of prototypes. Important measures are being adopted for the growth of designing and technological services and of experimental bases. By the end of the Seven Year Plan the number of designers and technologists on machine construction will have increased $2\frac{1}{2}$ to 3 times. It is intended to set up 130 new designing and technological organizations and to strengthen 790 existing ones, as well as to build many engineering colleges and experimental workshops.

In formulating the 1962 plan for new techniques it is most important to improve the liaison between the Union Republics and to define their mutual obligations in design work and in the manufacture of component parts. With a view to the realization of a single technical policy in machine building, the principal scientific research institutes are now forwarding to the Sovnarkhozes and leading enterprises their recommendations on the drawing up of plans for the tasks ahead.

As experience has shown, a very effective form for the coordination and planning of the tasks involved in new techniques is

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* i.e. required to earn all the income on a "commercial" basis - Ed.

provided by conferences for single sectors of industry which work out concrete and detailed recommendations for the technical development of each sector. A number of such conferences has already been organized by the Committee, in particular, on diesel and power machinery construction, the production of equipment and means of mechanization for the processing of oil, the production of equipment for the cement industry, and many other sectors. The Gosplany of the Union Republics will very shortly receive generalized recommendations on the formulation of plans for new technology in the sphere of machine building and the mechanization and automation of production processes.

Side by side with the work on the preparation of the plan for 1962, the workers concerned with machine construction must devote all energies to the mastering of the tasks planned for the current year. The fact is that the figures of fulfilment of the plan for new techniques in the first quarter give rise to some concern. In spite of the considerable work done by the enterprises, the Sovnarkhozes and institutes, the plan for new techniques in the spheres of machine and component manufacture and the mechanization and automation of production processes, has not been fulfilled.

This year's plan is both broader in scope and more intensive than last year's. A speedy liquidation of the lag introduced in the first quarter is therefore called for. The machine constructors of our country must work with great intensity in the second quarter and so meet the 22nd Congress of the CPSU with new successes in the creation and introduction of new models of machines.

Side by side with the further strengthening of theoretical research work in all branches of science and technology, it is essential to speed up the application of the results of scientific research in the national

economy. It is most important to bring into operation a precise and daily coordination between theoretical research work and the application of the results of such research, in order that the valuable discoveries of our scientists may bear fruit as quickly as possible, that the process of mutual enrichment of theory and practice may proceed uninterruptedly. This demands the establishment of the closest possible relations between the scientific institutions of the Academy of Sciences of the USSR and the scientific research institutes in different branches.

The resolution recently passed by the Central Committee of the CPSU and the Council of Ministers of the USSR "On means for the improvement of coordination between scientific research work in the country and the activity of the Academy of Sciences of the USSR" is of first-class importance for the further improvement of the work of our scientific institutions and the more complete coordination of the labours of different branches. It establishes the necessary conditions for speeding up technical progress in all branches of the national economy and, in consequence, for a more rapid tempo in the creation of a powerful material and technical foundation for communism.

TOWARDS NEW HEIGHTS OF TECHNOLOGICAL PROGRESS

*A. P. Aristov

+Mekhanizatsiya i avtomatizatsiya proizvodstva, 1961 (1) 1-4

The Soviet people have successfully crossed yet another frontier in their march forward towards communism. The augmented state plan for the year 1960- the second year of an ambitious septennium - has been completed before the date set. The figures and facts relating to the mighty advance of communism were announced in his report at the session of the Moscow Council on the 6th November 1960 by comrade F. R. Kozlov, member of the Presidium of the Central Committee of the CPSU. In the years 1959 - 1960 the industrial production of the country, according to the official figures estimated for the whole of the seven year period, should have risen by 17%. The actual rise in industrial production over this period, however, amounted to almost 23%, and in the first two years of the septennium, we shall have produced goods to the value of approximately 120 milliard roubles more than was envisaged for this period by the seven year plan. In the year 1960 more than one thousand new large industrial undertakings have entered the production arena.

The year 1960 has been remarkable for new achievements and

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*Member of the State Committee of the Council of Ministers of the USSR for Automation and Machine Building

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discoveries in the scientific and technological fields. The most striking of these is the flight into the cosmos and the return to earth of a heavy vehicle with living beings on board, once again testifying to the lead of Soviet science in many fields of knowledge...

During the 16 post-war years the industrial production of the USSR has risen each year by an average amount of 10.7%...

During the period from 1953 to 1960 only, reckoning on the basis of the growth of national income during that period, the actual income per head of population in the USSR increased by more than $1\frac{1}{2}$ times*. For all workmen and staff employees the change over was effected to a seven hour or six hour working day; from the 1st October 1960 there began the gradual abolition of income tax for workers and staff employees...

The July plenary session of the Central Committee of the CPSU called the attention of party and economic organizations, and of all scientific and technological workers to the necessity of increasing the efficiency of scientific research and project planning institutes, and of design offices, with the aim of keeping to the target dates for completion of all scientific research and design work, and of putting them into production.

In order to improve conditions for the creation of pilot plant embodying new techniques, the plenary session of the CC of the CPSU called upon all planning and economic organizations to free completely all testing and experimental workshops and undertakings from mass production work.

In pursuance of the decisions of the July plenary session of the CC of the CPSU, the Government of the USSR adopted a resolution for the full development of design and technological services and the

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*Sic. The index of income increased from 100 in 1953 to 150 in 1960, i.e. rose by 50%. - Ed.

strengthening of the experimental bases of mechanical engineering.

By the end of the septennium the construction is envisaged of more than 1½ million square metres of floor space for engineering workshops and for the accommodation of experimental bases, mechanical engineering enterprises and scientific research institutes; plans are also laid for extention of the training of engineering personnel in the higher and intermediate grades of qualification, and for the fullest possible provision of design and scientific research organizations for their use. The Council of Ministers of the USSR is to increase the number of design engineers and technologists in these organizations to 2½ to 3 times their present number. In connection with the extensive problems which accompany the automation and mechanization of industry, improvement in the skills and qualifications of engineering personnel has now acquired a particularly high degree of importance. Under the auspices of the State Committee of the Council of Ministers of the USSR for Automation and Machine Building, a college for the training of personnel in computer techniques is in operation; courses in instrumentation engineering have been organized at the "Bauman" Moscow Higher Technological College and at the Georgian Polytechnic Institute. There has been a significant increase in the number of post-graduate students admitted; by the end of the septennium the organizations of the State Committee for Automation and Machine Building will have increased the intake of post-graduate students to three times the present number. Nevertheless, the overall task of improving the skills and raising the qualifications of engineering personnel and of training scientific workers by means of the post-graduate system stands in need of a great improvement and further development.

In 1960 the State Committee of the Council of Ministers of the USSR for Automation and Machine Building adopted a series of measures for reinforcing and widening the scope of the scientific research and design organizations. At the present time, buildings for the accommodation of laboratories and experimental engineering plant are being constructed to a total extent of 110 000m^2 in area of floor space. In the course of the year 26 affiliated Institutes and Engineering Design Offices have been founded at Kiev, Lugansk, Smolensk, Volzhsk, Penza, Uglich and at a number of other industrial centres throughout the country.

In 1960 the volume of work carried out by the Institutes and Engineering Design Offices increased by 15%, whilst there was at the same time an improvement in the quality of the work done by them.

The volume of work on automation and mechanization of industrial processes increased twofold.

The leading Institutes, by co-ordination of their scientific research and design planning work on the study of the 1961 plan, have eliminated expenditure on non-urgent work and on duplication of work to the extent of 20 million (new) roubles. This means that about eight thousand engineering and technological workers will, in 1961, be employed on schemes of a more useful nature from the national point of view.

In 1960 the material and technical base of the State Committee* organizations was strengthened considerably: 1700 units of laboratory equipment, 800 machine tools and about one thousand units of other types of equipment have been distributed, thus increasing the amount of equipment possessed by Institutes and Engineering Design Offices by approximately 20%. The activities of the scientific research,

* State Committee (of the Council of Ministers of the USSR for Automation and Mechanization) - Ed.

technical planning and design organizations have shown improved results. During ten months only of theyear 1960, 896 new types of machines, apparatus and mechanisms of an experimental nature have been created by the State Committee organizations in co-operation with industry. Their introduction into the industrial field will ensure an advanced degree of improvement in the mechanization and automation of production.

The Krasnodar Automatic Factory has gone into production, turning out 500 000 m bushed roller chains per year. The design of the automatic equipment for this factory was undertaken by the NIITraktorselmash*. With the setting in motion of this factory's production capacity, dozens of other factories are freed from the manufacture of this type of chain. The integrated automatization of processes for the manufacture of this type of chain has enabled the productivity of labour engaged on it to be increased 7.4 times and the cost of production to be reduced by half. In view of experience gained in the planning of the Krasnodar factory, plans have been developed for the automatization of the means of production of bushed roller chains at the Ulyanovsk Factory with an output of 3 500 000m per year. In the third quarter of 1960 the "Stankokonstruktsiya" Factory has produced a series of machine tools which will prove to be of great value to industry in arriving at a speedy solution of problems connected with the mechanization and automation of certain production processes. A continuously operating horizontal metal drawing machine has been designed for the particular purpose of fashioning the outer surfaces (both flat and profiled) of metal components of small dimensions by means of a drawing process. By equipping this machine with an automatic feeding device it can be made fully automatic,

*Scientific Research Institute of Tractors and Agricultural Machinery-Ed.

and hence capable of being introduced into a mass production line.

By providing the surface of the cutting teeth of end milling tools with a hard alloy casing, labour productivity at the "Frezer" (Milling) Factory on this class of work has been increased to nearly four fold, and the manufacturing costs of the tools have been approximately halved.

An experimental factory under the control of NILAvtoprom (Scientific Research Institute of the Automobile Industry) has produced an automatic machine for assembling the valve cam rockers on the engine of the "Moskvich" motor car. The machine is designed for assembling the forward and the rear rocker levers together with the appropiate screws and nuts. The capacity of the machine is 360 rocker levers per hour. The machine frees the assembly operator from manual labour and improves the quality of the work, whilst the time spent on this particular assembly has been halved. This automatic machine is of a standardized design which can be used for the assembly of rocker levers on other types of engines at five other motor car works in the country.

An experimental factory, under the auspices of VISKhOM (All-Union Scientific Research Institute of Agricultural Machinery), has produced a potato harvesting combine. During the past year the combine was tried out on the harvesting of potatoes under difficult conditions in Moscow province. The tests proved to be satisfactory and the work done by the combine was the subject of high praise.

The All-Union Scientific Research (Machine) Tool Institute has perfected an automatic machine for grinding and sharpening drills with cylindrical shanks of diameters from 5 to 15 mm. This automatic machine shows a high degree of improvement in the quality of the finished drill, and productivity figures for this process

have been increased by a factor of 1½-2.

VNIIMetmash (All-Union Scientific Research Institute of Metallurgical Machinery) has produced a universal mill for the casting and rolling of aluminium wire of diameters from 7 to 11 mm. The saving effected by the introduction of this rolling mill into the national economy represents 0.54 million (new) roubles.

VNIILTekmash (All-Union Scientific Research Institute of Flax(?) and Textile Machinery) has introduced continuous process production lines:- at the Pavlovo-Posadsk (textile mill) Combine, in the preparation and carding departments of the wool combing mill for yarn manufacture:- at the Glukhovsk (mill) Combine, for the bleaching of medium and heavy cotton fabrics. These continuous process lines have increased the productivity twofold and have eliminated the heavy labour.

VNIIEKIProdmash (All-Union Scientific Research Institute of Food Production Machinery (?)) has put forward fourteen types of machines for mass production lines in the food preparation and packaging industry, and ten of the machines are already in use in production lines Amongst them are automated continuous production lines with production capacities of 400 and 1000 kg per hour, and also an automatic machine for making cartons for milk and filling them at the rate of 3600 cartons per hour.

In the past year considerable impetus has been given to the mechanization of two of the most laborious processes in engineering, - the processes of casting metals and of welding.

In this connection the experimental work carried out by the governing body of Uralmashzavod (Ural Engineering Works) for the automation of metal casting and welding is of particular value. In March 1960 the governing body of the works assumed the responsibility

of realizing, in a period of three years, the whole of the task envisaged for the seven year plan, that of completing the mechanization and automation of their casting and welding production.

In the steel casting detail shop the installation of closed circuit semi-automatic lines is planned, providing for the automatization of the process of preparation of the melt with the removal of the burned casting sand by pneumatic conveyor system. For the moulding process, a semi-automatic moulding machine with ten positions is being installed. Such operations as placing the mould box on the bottom plate, setting up the patterns, filling the mould box with sand, pressing down the mould, drying, tilting to the casting position, covering the half mould, all of which were previously done by manual labour, will now be carried out with the assistance of mechanization and automatic processes. The processes of moulding, casting, cleaning and dressing off the castings are also mechanized. As a result of all this, the working conditions are improved, and it has been found possible to change over from three shift to two shift working; at the same time the production of steel castings has been doubled.

In the welded construction shop the organization is planned of five continuous production lines in closed cycle. Universal assembly fixtures, tilting cradles for welding, manipulating devices, automatic and semi-automatic welding units, will all be introduced. All these will increase the output by weight of mechanized welding construction to 65% of the total welding turnover, instead of the existing 25.5%, i.e. more than two and a half times.

The creation at the Dmitrovsk Experimental Engineering Works, under the auspices of the Orstankinprom Institute, of an automated production line for use in the "Stankolit" Works for the moulding and

casting of light castings (light series) deserves attention. This production line raises the output of castings from 6110 tons to 10 320 tons per year; at the same time the productivity figure for labour has increased approximately fivefold. The automatic production line for the "Stankolit" works has been created as a prototype, suitable for adoption by any foundry possessing a conveyor system for the light series, medium series or mass series type of production.

NIIAvoprom (Scientific Research Institute of the Automobile Industry) has planned an automated production line for the manufacture of light castings in the malleable iron foundry of the Ural Motor Car Works. For preparing the casting moulds, use is to be made of a unit consisting of two automatic sand blowing machines, one of which prepares the bottom set of mould boxes, and the other the top set. The automatic moulders work in pairs with a reversible table for assembling the moulds and removing them when filled. This production line increases the supply of moulds on to the casting conveyor belt approximately twofold. The volume of labour required for the moulding, casting and knocking-out processes has been reduced to one ninth of the former requirements.

The automated foundry which has been set up at the Minsk Motor Cycle Works with a capacity of 1200 tons per year, also deserves attention. The production costs of 1 ton of castings in this foundry has been reduced from 850 to 550 (new) roubles, a reduction of 300 (new) roubles per ton. The productivity of the foundry has risen to 2.6 times the previous figure. It is estimated that the production of one ton of these castings liberates 700 machine hours of metal cutting machinery and saves the production of one ton of rolled metal sections.

In the past year the initiative shown by the Sovnarkhozy (Councils of National Economy) and by industrial undertakings in working out plans and in the preparation of automation and mechanization schemes, has grown to a remarkable degree. Technical planning and design organizations have been set up within the Sovarkhozy, and these are increasing in number. In an approximative manner of reckoning, 320 automated production lines are projected, and 210 metal working production lines have been set up, as against 158 in 1959. Most interesting work is being carried out by the Moscow City Sovnarkhoz. In association with the Scientific Research Institute of Technology and Production Organization the Sovnarkhoz has introduced 62 unit assembly lines and 18 automated production lines based on normal assembly methods. From data provided by the Institute, technical methods such as these for the equipment of industrial production are proving to be most economical. The time required to equip production has been reduced to between one eighth and one tenth of the previous time. It is reckoned that the project planning for the assembly of heavy specialized machinery and automatised production lines using the normal standard equipment requires not more than from six to ten month's work, whilst for the same planning processes for the former types of equipment three to four years were required. Experience shows that, for the same volume of turnover, the utilization of equipment assembled from standard units represents a saving of two thirds of the floor space which would otherwise be required. Furthermore, (and this is very important), it becomes economical to solve the problem of automation, not only of the means of mass production but also of serial production, in this way; it is to be noted that in Moscow more than half of the industrial undertakings are engaged in serial production.

The calculations and proposals of the Institute are confirmed by the test example of the Moscow Brake Works: an automated production line, made up of standardized assembly units, installed in this works has secured an eightfold rise in labour productivity. In all, seven automated production lines will be installed in the works. The equipment and installation costs will be redeemed over a period of two to two and a half years.

In 1960 a large amount of work was carried out on the modernization of existing equipment. This problem is of the greatest possible significance for the national economy. Increasing the productivity of existing equipment by modernizing it, raising the technical features of the equipment to the level of technological development created by new types of equipment and mechanisms, all this signifies the taking of a considerable step forward in the direction of technical progress, in a shorter space of time and with less outlay of capital.

The State Committee of the Council of Ministers of the USSR has supported the initiative of the Novo-Kramatorsk Works, which, through its own resources, has completed the technical planning documentation for, and organized the production of, the necessary details and assembly units which are required for the modernization of the equipment previously turned out by it. The State Committee has called upon the Institutes and Design Offices under its jurisdiction to create, within their organizations, departments for modernization of equipment, and, using their combined resources, to work out typical plans for the modernization of existing equipment. Nevertheless, the extent of work done in the modernization of existing equipment is still insufficient. The State Committee of the USSR for Automation and Machine Building has taken additional measures to speed on the work. These measures include the offering of material assistance to the

Sovnarkhozy in the realization of plans for modernization. With this end in view, specialists have been directed to all the republics. The Goskomitet has appointed 18 of the principal technological organizations, amongst which are included the Scientific Research Institutes (TsNIITMash, ENIMS, NIIKhimmash, NIILTekmash and others) to co-ordinate the task of modernization and to exercise control over effort in this direction. The realization has been decided upon of 350 projects of a typical nature for the modernization of serial production equipment now in use; arrangements are to be put in hand for the centralization of manufacture of 500 of the most important assemblies and mechanisms in a list which has been drawn up of these items.

In the past year the State Committee has paid a great deal of attention to the development of equipment, apparatus and mechanisms for dimensional series (standard type) production, as being the most important of problems having universal national significance.

In eight months of the year 1960, the scientific research and design organizations have developed and presented to the State Committee, for confirmation, dimensional series planning for 93 production items. Within the principal scientific research organizations of the State Committee, 41 departments (or groups) for developing dimensional series production items have been created. Development of the series is being proceeded with in 37 organizations under the State Committee, and in 88 organizations under the auspices of other bodies.

For creative work in connection with the development of standard type production, the State Committee has founded a training establishment, with wide scope for recruitment from the ranks of workers in the Institutes, design offices and industrial undertakings.

But even so, the volume of work undertaken and the tempo of its progress is still not sufficient for our national needs. The State Committee is taking steps to give added inducements to organizations for the further speeding up of dimensional standard production work, and also for bringing about the introduction of rationalized equipment, apparatus and mechanisms for dimensional series production in the appropriate branches of mechanical engineering. The decisions taken by the State Committee have already taken effect, for example, in the production of tower cranes for building purposes, constructed from unit assemblies, on the basis of dimensional standards developed by NIIStroidormash (All-Union Scientific Research Institute for Constructional and Road Machinery). The production of these cranes will now be organized at ten factories, with advance technical planning, and twenty factories, where cranes were previously constructed, will now be liberated from this type of work. The cranes will be built in eight standard types instead of one hundred.

In the last few years a series of resolutions have been adopted by the government for the furtherance of specialization within industry. In the industries selected for specialization, favourable conditions have been created for the mechanization and automation of their production, and these have had considerable effect. Savings to the extent of 600 million roubles have been realized by 27 Sovnarkhozy only, as the result of specialized production methods, chiefly in the category of heavy industrial products.

In the past year measures have been taken for the specialized production of standard tools and technological equipment, which are calculated to ensure an increased production output of tools by the specialized industries to an average extent of four times that in 1958, including cutting tools - 2.8 times, fitters tools - 7 times, measuring

equipment - 4 times. The reconstruction of 40 tool production factories and the building of 12 new ones are envisaged for the implementaration of these decisions.

For the new and reconstructed factories the setting up of 179 automated and semi-automated production lines is planned, and more than 4.5 thousand special machinery units and automatic equipment will be manufactured for this purpose.

Such a wide range of work demands the daily and constant attention of the planning Institutes and the Sovnarkhozy.

The measures adopted for the further development of foundry for increasing their work capacity in specialized lines, are also of great significance...

Recently, many of the leading workers have devised their own individual plans for raising labour productivity. At Leningrad and Kiev works, at the Likhachev Automobile Works in Moscow, at the Kharkhov Tractor Works, at the Sverdlovsk Uralmash Works and at other plants, many thousands of workmen have produced similar plans and carry them out with perseverance.

During nine months of 1960, inventors and innovators have put forward no less than three million such proposals. More than 1.7 million of these have been introduced into industry, with the result that, in a full year, 10 milliards of roubles would be saved.

The wide scope of competitive spirit in the field of accelerated technical progress has resulted in the overfulfillment of some of the plans for raising labour productivity.

According to the statistics of the State Committee of the Council of Ministers of the USSR on the labour force and the amount paid out in wages, labour productivity in industry during the year 1960 increased

by 6%, which shows a rate of annual increase in labour productivity approximately twice that which has obtained in the USA during the last years...

The July plenary session of the Central Committee of the CPSU underlined tha fact that it is only possible to secure a solution to the basic problem of the current septennium - that of gaining the maximum amount of time in the peaceful economic rivalry between Socialism and Capitalism - by increasing by every means possible the tempo of technical progress and, based on this, the growth of labour productivity.

An analysis of the work done by the creative organizations and industrial concerns in the technical improvement of industrial processes, shows that, along with the great achievements gained in the sphere of technical progress, there do exist many insufficiencies, and the tremendous reserves at our disposal are, as yet, only slightly utilized. The elimination of these insufficiencies, the utilization of our reserves, remain the central problem confronting all the organizations which are endeavouring to secure the technical perfection of our production methods.

First of all it is necessary to secure the universal fulfillment of plans for the development of technological documentation for new techniques, for the creation of pilot schemes for their subsequent introduction into industry.

The workers in industry and in the scientific research institutes must make the year 1961 a decisive one in the development of standard types of automation schemes for increasing productivity, in the modernization of existing equipment, and in the development of standard type machinery and fixtures based on dimensional standards.

In the current year there remains a great deal to be done in the further broadening of the experimental and design basis of machinery construction, the training of, and bringing increased skills to, designers and technologists, the strengthening of co-operative links between scientific and industrial workers.

The further raising of the level of competition in the task of increasing productivity, the attraction of a wide stratum of technological intelligentsia and workers into the stream of this competitive struggle will ensure the fulfillment of the commitments entered into by scientific and industrial workers for increasing the pace of technical progress.

Omissions in the translation are indicated by ... - Ed.

COMPLETE MECHANIZATION AND AUTOMATION OF PRODUCTION PROCESSES IN THE ENTERPRISES OF THE MOSCOW CITY SOVNARKHOZ (COUNCIL OF NATIONAL ECONOMY)

*D. E. Glagolev

+Mekhanizatsiya i avtomatisatsiya proizvodstva, 1961 (4) 1-5

The workers of Moscow entered the third year of the Seven Year Plan with a great victory on the labour front - on 20th December they reported to the homeland the completion of the state plan for 1960 and also of the increased Socialist obligations they had undertaken for the second year of the Seven Year Plan, all ahead of schedule. The overall industrial output increased 7% in 1960 over the corresponding value of 1959, while the productivity of labour was improved 1.5 times more than was scheduled. Industry took into mass production 1443 new products, including more than 570 new machines, machine tools, and various instruments. The industrial enterprises of the capital gave the country additional goods worth several milliard roubles.

In putting into effect the decisions of the CPSU concerning the speeding up of technical progress in the national economy, the industrial scientific research and design organizations are striving for the continuous improvement of production processes, the introduction of the latest technical ideas and advanced production methods.

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*Deputy chairman of Moscow City Sovnarkhoz

+NLL shelf mark: R0111. Holding: 1959 (1)-

During the past year the enterprises of the Moscow City Sovnarkhoz installed more than 90 automatic and semi-automatic production lines, which is 3.5 times more than in 1959; almost 300 mechanized flow and conveyor production lines, more than 2700 units of high-output machinery, 726 000 instruments and devices for automatic inspection and control of various production processes, 18 440 m of conveyor lines and about 700 units of handling equipment were installed.

The main trend of the technical re-equipment of the enterprises of the Moscow Council is the complete mechanization and automation of groups of machines, production lines, departments, and, eventually complete works. Thirty-five factories and 365 factory departments are scheduled for complete mechanization and automation during the Seven Year Plan. A typical feature of all measures concerned with mechanization and automation is that they are based on the widest possible utilization of the latest mechanization and automation equipment and the most modern production methods, which not only eliminates heavy manual work but also considerably increases productivity.

The first two years of the Seven Year Plan saw the complete mechanization and automation of six factories and about 90 production departments. The factories include: the "Krasnyi Proletarii "Machine Tool Factory*, the ATE-2 and the petroleum refinery, the First Area of the Moscow Cable Network, Thermal Power Station No. 20+, the Nogin area of the high-voltage grid, etc. In 1961 the scope of this work will be extended still further. In addition to the construction of 5 new completely mechanized and automatic factories and 50 production departments, it is scheduled to increase during the third year of the Seven Year Plan the rate and total volume of mechanization and

*Described in detail in Mekhanizatsiya i avtomatisatsiya proizvodstva, 1961 (4) 12-16 - Ed.
+Described in detail ibid, 20-25 - Ed.

automation in many other industrial enterprises, in order to maintain the continuous growth in the next few years of the number of completely reorganized works in which all the production processes are performed automatically or mechanically, without the use of manual labour.

The "Krasnyi Proletarii" machine tool works have organized completely mechanized flow production of the 1 K62 lathe, reducing the total amount of labour in its production by 30%, cutting the production cycle to 23 minutes and increasing the total production capacity of the factory by 25%, without any extensions to buildings. The total cost of all these measures was 2.7 million roubles* and the annual economy resulting from complete mechanization is 1.5 million roubles; this means that the cost of reorganization will be recovered in 1.8 years.

The workers and staff of the Moscow Petroleum Refinery carried out a number of radical measures in the automation of production, creating the first Soviet fully automatic refinery. Extensive use was made of automatic control devices for controlling the main parameters, and by employing automatic flow analysers, remote pick-ups, and other types of automation equipment; the control of all the principal production processes as well as the operation of the tank farm was made automatic. Automation includes the control of temperatures, consumption of gases and fluids, pressures and levels, and also the centralized control of all the production processes.

The complete automation of production resulted in a high stability of the processes, a point which is of decisive importance in improving the quality of petroleum products, eliminating heavy manual work, and the general improvement of the technical standard of the plant.

In 1960 the Moscow Champagne Plant+ completed work on the

*All costs are given in new roubles (£1 = 2.52 roubles) - Ed.
+Described in detail ibid, 32-36 - Ed.

world's first completely mechanized and automatic continuous-flow production of Champagne.

Extensive work on the complete automation and remote control of the 1st Area of the Moscow Cable Network, which is one of the leading enterprises of the electricity industry in the country, was completed two months ahead of schedule. The work involved the automation and remote control of 388 transformer substations and 41 distributing points, the provision of a large reserve of transformer capacity and an increase in the capacity of cables. These measures made it possible to man new transformer stations without increasing the total personnel and to ensure the continuous supply of energy to consumers.

The workers and staff of the Nogin area of the high-voltage grid belonging to the Moscow Power Authority created- by carrying out a number of extensive technical and organizational measures involving extensive use of automation and electronic equipment - a fully automatic power-supply system. As a result it has become possible to ensure a regular supply of power to industry, and to control the numerous substations of the area automatically from two points. Alongside with many other technical and economical advantages achieved, the personnel has been reduced by nearly 70%.

A point of considerable interest is that the Economic Region now has three fully mechanized automatic precision-casting foundries. By improving the production methods the output of these foundries has been increased 1.5 - 2 times, without increasing the floor area; the productivity of labour increased 30-50%, the cost of a ton of saleable castings increased 3 times, while the number of workers was at the same time reduced by 60% and the subsequent machining of castings has been reduced to a third. It is now possible to produce a much

wider range of castings requiring no machining. In these fully mechanized automatic foundries the use of automatic and semi-automatic machines, continuous transportation equipment, and devices for automatic inspection and control of processes, has made it possible to organize production on the flow principle and to completely eliminate manual work. The experience gained in these foundries is now used by other industrial enterprises in improving theirs.

At two enterprises in the Economic Region, work is now in progress on the creation of model welding shops. Workshops are being built at the Likhachev Motor Works for the production of driver's cabs for the ZIL-130 lorry, and at the "Kompressor" Works for the welding of compressor and refrigeration plant components.

These model shops are intended for the publicizing of the "sub-assembly" method of manufacturing and assembly by making maximum use of up-to-date welding processes, such as gas-cutting, automatic and semi-automatic, gas-shielded, submerged, and others. These model shops will have flow lines for welding assembly incorporating equipment which can easily be retooled for the manufacture of other products. The latest mechanized production processes and mechanical handling equipment will ensure high quality production in these model shops.

The first fully mechanized automatic welding-assembly line for the manufacture of refrigeration equipment is already in operation. 70% of all welding processes on this line are automatic. This increased the productivity of labour three times.

A fully mechanized factory department which produces "Chaika" vacuum cleaners is now two years old. The degree of mechanization of this plant is 91.2%, the labour force needed in manual assembly has been reduced almost to a half, the productivity of labour increased

five times, while the saving due to mechanization amounts to 36 000 roubles. The department uses an automatic plant, for painting vacuum-cleaner components in an electrostatic field, followed by infra-red radiation drying. The plant increased the productivity of labour several times and halved the material consumption.

At a factory for low-voltage equipment considerable success has been achieved in the mechanization of assembly; 20 different products are assembled here mechanically. The installation of a line which can be adapted for the assembly of different products increased the productivity of the workers by 60% and reduced the cost of this work by 22%.

The "Dinamo" Works also operate a completely mechanized section for the assembly of electric motors, which increased the productivity of labour by 30%.

The "Tizpribor" Works has developed and is now using a vibration plate conveyor in the assembly of automatic control instruments. This reduced the cost of assembly by 30% and increased the productivity of labour by 8-10%, giving an economy of over 16 000 roubles.

A general review of the level of production and organization methods carried out in all the enterprises of scientific-research and design institutions produced valuable information for determining the directions for a further improvement of the measures which must be taken to increase production and improve its quality, in various branches of industry.

During this review it became possible to examine and assess the level of technical development of 850 000 production processes, of which 535 000 were found to be up to date. It has been decided to improve 280 000 production processes and to completely change a

further 99 000. This review became a real mass undertaking in which more than 150 000 leading workers, innovators, Communist shock workers engineers, scientists, and experts took part. The realization of the recommendations made during this review will result in a considerable increase of output. A total of about 400 advanced processes were selected for use in similar industries.

The new trend in metal working - the manufacture of blanks and components by plastic deformation and the inclusion of these processes into the flow lines of machine shops - is extremely promising. These advanced techniques are already in use in a number of engineering works. The Likhachev Motor Works are already using, for the first time in the world, plant for the manufacture of helical bevel gears by rolling, which has been developed in co-operation with NIITavtoprom (Scientific Research Institute of the Technology of the Motor Industry). The new method reduced the time needed to produce a gear eightfold, and gave an economy of 80 000 roubles. It has been decided to introduce the new machine at a further 15 engineering works producing helical gears.

In the same factory the flow line for the manufacture of aspherical universal-joint pins incorporates a hot-stamping process which replaces 6 automatic lathes.

The use of this new process improved the utilization of metal from 0.4 to 0.83 and produces an economy of about 84 000 roubles.

The experience of a number of factories which make plungers for pumps and other machines by stamping them from blanks heated by high-frequency current is of considerable interest. A factory making oxygen equipment produces the torch nozzle by cold stamping; this technique reduced the number of operators engaged in the work by 15.

The Moscow Electrical Machinery Works are using an original process in the manufacture of press dies; the components are cold pressed in hydraulic presses. The method is based on the plastic deformation of metal under high pressures.

Some industries of the Sovnarkhoz have accumulated considerable experience in the automation of stamping operations. For example, the Moscow Television Equipment Works produces 80 television-set components by automatic stamping. As a result the labour consumption for one set of components was reduced from 4.42 hours to 1.2 hours. The experience of this factory is now being used by 14 other enterprises of the engineering and instrument industry.

It has been decided to make the manufacture of steel components by plastic deformation the predominant method; it will gradually replace obsolete methods of making blanks and components by conventional metal-cutting processes. The adoption by all engineering works of plastic deformation in forming metals would save tens of millions of roubles in the economic region, by reduced-metal consumption alone.

Big economies can be achieved by combining several production processes into a single flow, which eliminates the transportation of components from one department to another. At the ATE-2 Works an automatic line for machining shafts has been installed which combines metal-cutting machines (milling, grinding, broaching, thread-cutting) with the equipment for assembly (including riveting), hardening and tempering (high-frequency heating) and the drying of finished components. The installation of three such lines will release 46 operators and increase the output 1.8 times.

The combination of stamping, machining, welding, painting, electro plating, and heat treatment into a single flow line can be

realized in many engineering works of the Sovnarkhoz which are using mass production and large-batch production methods, and will produce big economies.

In realizing measures aiming at complete mechanization and automation the problems of internal transportation become very important. At present the industry of the Sovnarkhoz employs 74 000 men in stores and in transportation between departments. It is quite obvious that the release of this enormous army from heavy manual work is a task of first priority. An investigation carried out in the engineering industry showed that the mechanization of transportation inside a flow line increases the productivity of labour by 8 - 10%.

Several interesting methods of overcoming transportation problems have already been put into effect. An original system developed at the "Krasnyi Proletarii" Machine-Tool Works for the transportation of components along a 50-m production line consists of hydraulic lifting tables for receiving the work piece, two-stage roll tables for storing components between operations, and an automatic overhead transportation system. The pneumatic transportation system used in the machine shop of the same factory for handling small components is also noteworthy. A very effective system for handling heavy tank shells is used at the "Kompressor" Works; it consists of inclined roll tables and pneumatic lifting devices. The following, too, are of considerable interest: a bucket conveyor for small components used in the chill-casting foundry at the "Izolit" Works, a cable transporter with programme control used at the "Krasnaya Roza" Silk Combine, pusher conveyors with automatic control used at the Likhachev Motor Works, etc. All these means of mechanization and automation of transport operations can be successfully employed in many other industries and form the basis for a

further improvement of internal transportation.

Some enterprises have accumulated experience in the mechanization and automation of decorative and protective metal-coating processes. The "Kalibr" Works, for example, have developed a circular automatic line for the double chromium plating of components; on this line 10 different operations are performed automatically, according to a definite programme. The output of the line is twice as high as that of a comparable manual one. A factory producing low-voltage instruments which manufactures a large number of products in small batches uses an automatic electro-plating flow line which can be adapted for handling various components; its individual operations can be changed according to the desired programme.

These automatic lines have solved many mechanization and automation problems associated with metal coating. The experience of these factories is now being utilized in 12 further enterprises where it will improve working conditions and double the productivity of labour.

The painting of components in an electrostatic field is gaining in popularity. This method is already used in 14 factories, where its economic effect is high. It should be sufficient to state that each such plant reduces the consumption of paint by 30%. The spraying of components in an electrostatic field will be introduced in all the engineering works of the Sovnarkhoz, where it will make possible the complete automation and mechanization of all painting operations. An original remotely controlled plant for coating rubber overshoes in an electrostatic field has been installed at the "Krasnyi Bogatyr" rubber factory. It incorporates electrostatic atomizers running at 1000-1500 rev/min. This plant eliminated heavy manual work, sharply increased the productivity of labour, and improved the working conditions.

A promising development in the automation of inspection and control of various production processes is the use of instruments and devices based on the application of radioactive isotopes. Such instruments are already in use at 24 factories of the Council; they are employed for stopping the pusher type conveyor motor when the trolleys are held up, for controlling and counting the strokes of metal shears, for stopping automatic presses should more than one blank be fed in for controlling and counting the filled and empty moulds on foundry conveyors, etc. It should be pointed out, however, that these are only the first steps in the application of radioactive isotopes. Experience has proved the effectiveness of this method and stresses the need for its further development by all available means. In 1961 over 100 different instruments using radioactive isotopes will be installed in various branches of industry.

"Mars" electronic recording and signalling machines used in the automatic control and regulation of production processes are becoming increasingly popular. The "Krasnyi" Bogatyr" factory employs three "Mars-200R" machines for controlling the production of rubber boots on 147 presses. This considerably improved production and reduced the number of rejects; the economy achieved is 100 000 roubles. At present work is in progress on the introduction of electronic machines to other branches of industry.

In order successfully to solve the numerous problems involved in the mechanization and automation of production, industry must have up to date automation equipment which can be easily adapted to machining and processing various products, and easily fitted into the existing set of operations to produce a completely automatic or mechanized cycle. The development of such equipment proceeds in two directions: firstly, the modernization of existing equipment and,

secondly, the development of new effective means of automation and mechanization.

Many enterprises of the Sovnarkhoz have wide experience in the modernization of equipment and its use on automatic production lines. The "Stankonormal'" Works developed an adaptable automatic production line for the cold rolling of thread, which makes use of the existing machines. It increased the productivity of labour by 40%, which produces a total annual economy of 20 000 roubles.

The "Frezer" Works have made extensive use of existing production equipment in their mechanization and automation programme. They built highly efficient production lines by modernizing existing machines and connecting them by means of transfer units.

In co-operation with SKB-6 (Special Design Bureau No. 6) the works is now engaged in the construction of a completely automatic production line for the manufacture of 4-6-mm diameter screw taps. On this line, all operations-starting from receiving the blank and finishing by packing the tools- will be performed completely automatically. In constructing this line extensive modernization of existing equipment was involved. It is estimated that the annual output of the new line will be 9 million taps. Its installation will release 45 operators for other works, increase the productivity of labour 5-6 times on a floor area only 2.5 times larger, and give an annual saving of 600 000 roubles. A total of 42 automatic lines will be built in this factory, using existing machines; this will increase the output 2.2 times.

Extensive work is in progress on the improvement of the existing equipment in connection with its use on automatic lines at the "Serp i Molot", ATE-2, Vladimir Il'ich, "Dinamo", "Kalibr", "Borets",

"Stankolit", Hard-Alloy Works, and other factories.

The main direction in the development and construction of new means of automation is the standardization of the sub-assemblies of automatic machines. At present the industry of the Council produces standard sub-assemblies and sections on which the consumer works make highly efficient metal-working equipment. It is no longer necessary to "attach" a production process to the existing manufacturing procedure, which invariably resulted in a sacrifice of the main factor - productivity. The maximum possible standardization of sub-assemblies, independent units, and complete machines will make possible the easy construction of high-quality means of automation.

The "Krasnyi Proletarii" works are operating an automatic line for the manufacture of gears for the second year. The line can be adapted for the production of 10 different types of gears. The same works have in operation an automatic line for the production of 13 different types of splined shafts. This line is attended by 3 operators who replace 14 operators previously engaged in this work using standard machines. The new automatic line increased the productivity of labour 5 times.

A brakes works developed and built, in co-operation with NIAT (Scientific-Research Institute of Motor Transport), from standard machines and units, a circular line for machining the driver's control valve*. This increased the productivity of labour 8 times. It is intended to build several similar lines, which will considerably increase the productivity of labour. Other engineering works are co-operating with the same research organization in the construction of automatic lines and transfer machines from standard units. On changing the product these lines can be adapted for machining altered components by the users themselves. An extensive use of standard

*Meaning of Russian original not clear. - Ed.

units and components will not only improve the adaptability of the equipment but also speed up their construction and reduce the cost.

The reduction to a minimum of specially made machines, the maximum possible standardization of equipment and means of automation is the task immediately facing the engineering industry of the Sovnarkhoz.

Some experience in this field is already available. For example, using only 9 standard designs automatic lines are being built for the manufacture of bearings, and one standard design is sufficient to build lines for machining various valves and sleeves for tractor and automobile engines. The installation of such equipment will help to save tens of millions of roubles.

Completely automatic production lines which combine a complete production cycle, beginning from loading the material and finishing with packing the product are already in the design stage. According to the type of product these lines will incorporate casting, forging, metal-cutting, heat treatment, electro-plating, finishing, and packing operations. Wide use will be made of rotary automatic lines whose development and building has already begun at some of the Sovnarkhoz enterprises.

In 1961 the industry is facing big new problems connected with the further improvement of production. Five factories will be completely mechanized or made automatic: a carburettor works, a crisp roll bakery, the Frunze Works, "Krasnoe Vereteno", and "Krasnyi Oktyabr", as well as 50 independent departments, plants and processes. During the year 95 automatic and semi-automatic lines and 218 mechanized flow and conveyor lines, about 2100 automatic and semi-automatic machines, nearly 10 500 metres of

continuous-transport equipment, and 734 instruments and devices for automatic control of processes will be brought into use at the enterprises of the Sovnarkhoz. These enterprises have already started Socialist competition on a wide front in honour of the 22nd Congress of the CPSU.

Moscow industrial workers took on new and heavier obligations: to complete the 1961 plan for overall output and essential individual items ahead of schedule by the 25th December, and to overfulfil the plan for the increase of productivity of labour by 15%. As compared with 1960 the output of principal products will increase as follows: automatic production lines for machining metals, 1.4 times; machine tools with program control, 6.5 times; gear-rolling machines, 1.5 times; special transfer machines by 15%; instruments and devices for the automation of continuous processes, 3.3 times; electrical machines and devices by 11%, etc. This is a very formidable task and can be fulfilled only by continuously improving production methods, using the latest achievements of science and technology, in industry, and the complete mechanization and automation of production processes. The enterprises and organizations of the capital know this well and there is little doubt that they will honour the obligations which have been undertaken.

AUTOMATION IN PRODUCTION WELDING

(All-Union Conference on Integrated Mechanization and Automation of Production Welding)

A. I. Akulov

*Mekhanizatsiya i avtomatizatsiya proizvodstva, 1961 (2) 57-60

In November of last year (1960) an All-Union scientific and technical conference took place at the "E. O. Paton" Arc Welding Institute of the Academy of Sciences of the Ukrainian SSR. Conference discussed questions of complex mechanization and automation of welding. It was convened by the State Scientific and Technical Committee of the Council of Ministers of the USSR, the State Committee of the Council of Ministers of the USSR for Automation and Machine Building, the State Scientific and Technical Committee of the Council of Ministers of the Ukrainian SSR, the "E. O. Paton" Institute of Arc Welding of the Academy of Sciences of the Ukrainian SSR, the Central and Kiev Region Board of the Scientific and Technical Society of the Machine Building Industry.

Opening the conference, the Deputy Chairman of the State Committee of the Council of Ministers of the USSR for Automation and Machine Building, A. V. Topchiev, remarked that, in its historic decisions on the new growth of industry, the 21st Congress of the CPSU had set the task of achieving maximum mechanization of production processes in the period 1959 - 1965. In carrying out

* NLL shelf mark: R0111. Holding: 1959(1)-

this decision, about 2000 automatic and semi-automatic production lines were started up in USSR industry in 1959, and the production of over 2300 types of new machines and installations was mastered.

Welding is one of the most important production processes in the metal working industry and in building. Therefore, the technical re-equipment of our industry would result in further increase in the level of mechanization of assembly and welding operations, and in the creation and introduction of new progressive forms of welding. The June 1959 and July 1960 plenary sessions of the Central Committee of the CPSU paid great attention to the development of welding techniques. By 1965 it is intended to double the production of welded assemblies in our country, to increase by not less than 2.5 times the use of automatic submerged-arc and resistance welding, to double use of electroslag welding and to increase six-fold the use of gas arc welding. The average level of mechanization of welding operations should be increased to 40%. Wider use of welded structures in industry, and an increase in the level of mechanization of welding operations will enable an economy of 20 milliard roubles to be made during 1959-1965. At the present time, the USSR surpasses any state in Europe as regards the amount of welding apparatus available, and has overtaken the United States as well with respect to the scale of application of electroslag and arc welding.

Further development of welding in this country should follow the path of complex automation and mechanization of production processes, the development and introduction of new welding processes and advanced production process technology.

The representative production welding organizations set up by the decision of the Government should become schools of advanced

experience. The report of the Director of the Institute of Arc Welding of the Academy of Sciences of the Ukrainian SSR, Academician B. E. Paton, was devoted to the way in which welding had developed in the USSR. He stated that in the USSR industry at the present time more than 12 000 automatic and semi-automatic arc-welding machines are in operation and more than 40 000 resistance-welding machines. Mechanization of welding operations led in 1959 to a specific annual economy in wages over 140 million roubles. The wide use of modern automated equipment and welding methods enabled the level of mechanization of welding operations to be increased to 24% towards the end of 1959, as opposed to the 11% achieved at the beginning of 1958. About 7.5 million tons of welded structures were produced in the USSR in 1959, which exceeds the 1958 level by 30%.

The economy resulting from the introduction of welding in the production of various structures in 1959 amounted to about 650 million roubles. In the first six months of 1960, about 3 million tons of welded structures have been produced by mechanized methods alone. Comforting successes have been achieved in the development of weld surface reinforcement work. In this question, priority belongs to the metallurgical industry in the reclamation of worn components of metallurgical and mining equipment. Weld surface reinforcement of steel rolls enables the productivity of rolling mills to be increased by 2 - 10%. The use of weld surface reinforcement at the Magnitogorsk Combine enabled about 1000 tons of repair metal to be economized and an additional 306 000 tons of metal to be produced in 1959.

The new highly-productive wide-layer method of weld surface reinforcement using a tape electrode is very promising. In 1959 the volume of weld surface reinforcement work rose by not less than

twice, and the level of mechanization of the work rose by 2.5 times, this resulting in an economy of 220 million roubles. The development of welding within the last two years is characterized by further increasing the level of mechanization of welding production on the basis of complex mechanization of the entire production process, and the building of pre-fabrication*transfer lines. The speaker also outlined the prospects of the development of welding in the USSR over the next 20 years.

Gas flame processing of metals, and the prospects of its development, formed the subject of the report by the director of VNIIAVTOGEN (All-Union Scientific Research Institute of Autogenous Treatment of Metals), Candidate of Technical Sciences A. N. Shashkov. The following are being developed: oxygen cutting, which forms 60 - 65% of gas flame processing; gas-arc processes of welding and cutting; gas weld surface reinforcement, soldering, hardening and welding; the application of metal, plastic and ceramic coatings. In 1965, the production of oxygen should increase 3 times in comparison with the 1958 figure, and the production of all types of gaseous fuel should increase by 3 - 3.2 times. During the post war years the number of gas flame processing equipment has increased from 13 to 84. Manual apparatus is being replaced by powerful mechanized units using up to 300 m^3 of oxygen an hour. Within the next few years, units with an hourly oxygen consumption of up to 3000 m^3 will go into operation. A transition to more economic production of acetylene is contemplated, using acetylene plant with a high productivity (up to 300 m^3/h) instead of individual generators. In the machine building industry, in ship building and in building, the degree of mechanization and automation of gas flame processing will be increased. Many

*lit.: assembly-welding - Ed.

hundreds of machines for oxygen cutting should be produced before 1965, including machines with photo-copying devices, programme control and a fully automated cycle of operations. Specialized installations will also be produced.

A new stage in the development of welding technology, as was noted in the report by Candidate of Technical Sciences P.I. Sevbo (E.O. Paton Arc Welding Institute), is indicated by the mass transition from the mechanization of welding operwtions to the complex mechanization and automation of the entire prefabrication process, including such laborious and so far insufficiently mechanized operations as assembly, auxiliary, preparatory, finishing and other operations. For example, at present in the welding shops of factories of the coal industry, welding itself together with its auxiliary operations only takes up 34% of the volume of prefabrication work. The remaining 66% is taken up by preparatory, assembly and other operations, which are provided with only 27% of the process equipment in the shop. The problem of the mechanization and automation of prefabrication processes requires the building of highly specialized machines and assemblies for mass and large-batch production, and of universal machines and assemblies for one-off production. One of the difficulties of the complex mechanization of welding production - the necessity for individual design, production and development of specialized assemblies and lines - can be overcome by standardization and unification of the basic elements of this equipment in series production.

In the report by M.I. Baranov (Moscow) it was stated that automatic welding and the mechanization of welding operations are used most of all in mass production and large-batch production. Their use in small-batch and one-off production is only possible when the welding equipment is standardized, and as a consequence of this it can be made

up rapidly, at low cost and with repeated use of the standardized welding equipment sub-assemblies. The report examined the main pre-requisites for standardizing welding plant and equipment. The classification is based on criteria which make it possible to unite components and sub-assemblies into production-process groups which can be welded together on installations assembled from standardized elements, including welding final control mechanisms, sources of supply for the welding arc, electrical apparatus, auxiliary plant, equipment and other elements.

The importance of mechanizing auxiliary operations, the design of the appropriate plant (welding manipulators, rotating devices, positioners, tilting devices, roller benches etc.) and the prospects of building basic standard plant for increasing the level of mechanization of auxiliary work in the production of welded structures were the subject of the report by L.A. Zhivotinskii (VPTI TYaZhMASh Moscow-the All-Union Design and Planning Technological Institute of Heavy Machine Building).

V.S. Volodin (State Committee of the Council of Ministers USSR for Automation and Machine Building) stated that basic standardization of production processes and means of mechanization, which is an important factor in the complex mechanization and automation of production welding, is very effective economically. The development of an economically substantiated basic standardization of production processes for welding and weld surface reinforcement, and for welding and auxiliary equipment, is of great importance to the national economy. However, the theory of designing a dimensional series of basic equipment in production welding has not yet been sufficiently developed.

Doctor of Technical Sciences N. O. Okerblom (Leningrad Polytechnical Institute) said that the design of an article should make it possible to employ modern advanced welding production processes. Therefore, problems of design and of developing production process technology should be solved comprehensively. This would make it possible to obtain the maximum effect from the mechanization of welding and auxiliary operations, because it would make the production of structures less laborious by cutting adjustments, machining and heat treatment. In addition to cast, forged and stamped blanks, the use of spatial bent blanks should also be considered in welded structures.

The use of resistance welding in prefabrication transfer lines was discussed by Candidate of Technical Sciences N. Ya. Kochanovskii (VNIIESO - the All-Union Scientific Research Institute for Electric Welding Equipment). Resistance welding, particularly multi-electrode resistance welding, gives the maximum automation for the mass production of structures. Recently VNIIESO and the 'Elektrik' Works have developed a large number of machines for resistance-welding sub-assemblies for motor vehicles, diesel locomotives, electric locomotives, wagons and other articles, intended for conveyor and prefabrication transfer line installations. In the production of reinforcement metal for reinforced concrete, welding machines are used in which the operations of straightening the wire, moving it, supplying the transverse bar, welding and cutting off the mat to the required length are all automated. However, there are not yet enough production lines using resistance welding.

The report by Candidate of Technical Sciences R. I. Lashkevich and S. L. Mandel'berg was devoted to complex automation of the production of welded pipes for trunk pipelines. At present the

amount of metal used on such pipes amounts to more than $1\frac{1}{2}$ million tons. The fact that welded pipes can be mass-produced has enabled individual operations to be automated at the existing factories, and has made it possible to increase productivity by 15 - 20% whilst reducing the attendant personnel by 25 - 30%. For example, complex automation of the fabrication line which has been carried out in the electric welding shop of the Chelyabinsk Pipe Rolling Works has almost doubled the productivity of the line. The technological possibilities of automatic submerged arc welding which at present gives a welding speed of 140 m/h are not yet sufficient, because 5 - 6 welding lines are required for each fabrication line. The development of a new welding production process giving a speed of up to 200 m/h would require corresponding mechanization and automation of operations connected directly with the welding (flux supply, direction of the electrode along the edges, switching on and off the welding current and so on). Servomechanisms for directing the electrode along the edges using photoelectric and induction-type pick-ups, as well as mechanisms for automating the entire welding cycle, assist in complex mechanization of the whole process of producing welded pipes and in increasing its productivity.

M. V. Orlov (Leningrad), who reported on complex mechanization of welding operations in the shipbuilding industry, said that further mechanization of these operations (at the present time the level of mechanization is 60%) will develop with progressive rationalization in the design of ships. Dividing ships into sections, on which the greater part of the welding operations can be carried out in the shops, will make it possible to use the most progressive and automated welding methods.

The report by Candidates of Technical Sciences Yu. V. Raevskii and B. F. Lebedev and V. A. Beletskii told of the application of the method of temporary deformation of sheet structures, which enables over-size structures to be temporarily converted into structures of manageable size by rolling up the flat strips. In this way, the greater part of the welding operations can be carried out in shops, which enables the level of mechanization of welding to be increased to 60 - 70%.

S. I. Rusakov (Gor'kii Motor Works) said in his report that the mechanization of welding at the works is at present 94.5%, with a production of 236 000 welded structures a year. This high mechanization percentage is achieved by using resistance welding, submerged arc welding and other high efficiency welding methods. During the seven year plan, the level of mechanization at the factory will rise by another 2 or 3%. At present the most attention is being paid to increasing the productivity of welding operations, lowering the laboriousness of production by developing components more suitable for production processes, and complex mechanization and automation of the prefabrication processes.

Great interest was shown in the report by V. D. Kolesnikov on experience in the complex mechanization of production welding at the "October Revolution" Lugansk Diesel Locomotive Building Works. The labour spent on welding operations amounts to 10% of the overall labour involved in building a diesel locomotive. A special design bureau for mechanization and automation of production has been organized at the works; sections for producing means of mechanization have been set up using the space, equipment and man power released due to mechanization of the processes.

A mechanized line has been put into operation, a conveyor, which ensures a continuous assembly and welding of the frame of a locomotive at a forced pace. Eight automatic and semi-automatic machines are installed in the line. The welding operations in the production of compressed air reservoirs, the sides of the bogies, hydraulic couplings and turbine wheels, universal shafts and so on, have been mechanized.

As a result, the level of mechanization of welding operations has been almost doubled in 1959 and the first six months of 1960, amounting to 24.4%, and the amount of automatic and semi-automatic machines has increased by more than double and amounts to 52 items. The output of welded metal structures has almost doubled for one year alone. The aforesaid measures have given the factory a specific annual saving of about 2 million roubles. Measures to be taken in 1960 - 1962 will increase the mechanization of welding by 50%.

A number of interesting reports concerned highly mechanized production lines in series production. Candidate of Technical Sciences D. P. Lebed' and Engineer Ogara spoke about the line set up at the "Babushkin" Metal Structures Works at Dnepropetrovsk for producing I-beams 12 m in length, 600 - 2000 mm in height, with a boom width of 220 - 600 mm and a web thickness of up to 20 mm. Over 300 pieces of equipment are installed on this production line, of these about 30 automatic and semi-automatic welding machines are in a single-arc modification. In this line, four automatic single-arc machines with a speed of about 140 m/h simultaneously weld tacking 5 - 6 mm in cross-section. The final welding, which ensures complete fusion of the web, is carried out with an automatic three-arc machine at a speed of 100 m/h. This production line increases labour productivity by 5 times.

At the Ural Wagon Works (report by Candidate of Technical Sciences N. D. Portnoi) the line method of production is fully carried out on assembling and welding high-capacity wagons. In the line for producing the hatch covers there are 24 automatic welders which carry out 80% of the welding operations in this line. As a result the cycle of work has been reduced to 3.5 minutes instead of the 30 minutes with the earlier production process. There are great possibilities for automating production in the use of multi-electrode resistance welding of thick metal (up to 6 - 10 mm) in wagon building. The introduction of production lines using this method of welding hatches will cut the cycle of the line to 15 minutes and will give the works an annual saving of 3 million roubles.

By making wide use of resistance welding, the productivity of welding in wagon building will increase by four times.

The organization of line production of tank wagons with a capacity of 60 m^3 at the Zhdanov Heavy Machine Building Works (report by D. P. Antonets) has made it possible to carry out 96.7% of the welding operations using submerged arc welding. The flow line consists of a number of conveyor lines with a cycle of assembling and welding the individual sub-assemblies and the complete tank. As a result the production cycle has been cut by almost 50%. Those taking part in the conference listened carefully to the reports on the application and the prospects of development of modern welding methods: gas-arc welding (Candidate of Technical Sciences N. M. Novozhilov) and granulated-electrode open arc welding (Dr. of Technical Sciences I. I. Frumin and Candidate of Technical Sciences I. K. Pokhodnya).

In the speeches made by the participants in the conference, examples were given of the effectiveness of using modern methods of welding and complex mechanization of prefabrication operations,

weld surface reinforcement and so on. Participants wished that the scientific research organizations would give more attention to automating welding operations in various branches of industry; they also noted that the rate of transferring to complex mechanization of welding production is not yet satisfactory. This is put down to insufficient production of welding and auxiliary equipment and welding materials.

The reviews of the structures produced by industry in an attempt to reduce the labour spent on producing them by introducing welding and of the welded structures already produced do not make sufficient allowance for the necessity of mechanizing and automating welding, assembly and auxiliary operations.

There are also insufficient skilled welding operators in industry. In its resolutions the conference drew the attention of the Gosplan SSSR (USSR State Planning Commission), the State Scientific and Technical Committees of the USSR and a number of other oganizations to the necessity of developing basic standard solutions and of coordinating work on the mechanization and automation of production welding, on developing measures to increase the technical level and the equipment of auxiliary operations, on increasing the production of welding and auxiliary plant and welding materials. The conference admitted the expediency of stepping up work on the standardization and unification of welding plant and production processes. The most important task before organizations working in the field of welding is the all-out development of work on the complex mechanization and automation of welding processes in industry and in building.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the National Lending Library for Science and Technology, Boston Spa, Yorkshire. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar reports they may have made in the National Lending Library.

EDUCATION

GIFFEN, E., et al.: "Engineering Education in the Soviet Union", Institutions of Civil, Mechanical and Electrical Engineers, London, 1957.

(Report on visit by 9-man team of engineers to the USSR in September 1956. Establishments visited included in Moscow: Molotov Power Institute, Bauman Institute, Moscow Institute of Chemical Technology, Moscow Aircraft Institute, Moscow State University, Moscow Radio and Electronics Technicum, Likhachev Automobile and Bicycle Factory and associated trade school, technicum and palace of culture; in Leningrad: Leningrad Polytechnic Institute, Institute of Chemical Technology, Institute of Constructional Engineering, Electric Power Technicum, and Leningrad Metallic Industries Enterprise. This report is a brief and comprehensive

survey the engineering education system in the USSR and includes a specimen syllabus and higher education entrance examination questions, student population statistics, notes on salaries, etc., but few details of the particular institutions visited are given.)

NLL shelf mark: V 116

AUTOMATION

--- "Symposium on Automatic Control: The British Contribution to the First International Congress of the International Federation of Automatic Control, 27th and 28th September 1960". Transcript of shorthand notes.

(This transcript includes information on visits made to various institutions in the USSR in 1960. These included the 1st State Ball Bearing Plant in Moscow, the Sverdlov and Krasnyi Proletarii Machine Tool Factories, the Tocholectrumibov (sic. ? Tekhelektropribor) plant in Kiev, the Vibrator Plant and the 2nd State Watch and Clock Factory in Moscow, the Moscow Small-power Car Factory, a distillery in Leningrad, Power Station 20 of the Moscow grid. Research institutes included the Institute of Automatics and Telemechanics in Moscow and the Institute of Automation in Kiev. Educational establishments included the Moscow Power Institute and the Institute of Electrotechnics in Leningrad. A visit was also paid to an oil refinery in Baku. Papers by USSR authors read at the Congress are also discussed.)

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The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations" issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

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Tekhn. kino. i telev. 1960 4 (2) 9-18

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Stal' in English, 1961 (3), which has just been published, includes a report on mastering the operation of a 500-ton open-hearth furnace on coke-oven gas and oil. The successful mastering of the operation of a 500-ton open-hearth furnace on coke-oven gas and oil showed that further improvement in furnace operation was possible, especially by adopting purely gas firing.

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Zhurnal vychislitel'noi matematiki i matematicheskoi fiziki
Neftekhimiya

The first issues of the translations are due to appear "later this year".

Recent issues of the Bulletin of Material on the Geography of the USSR, published by the Department of Geography, The University, Nottingham, contain "Agricultural Statistics" (No. 10), an article on "Economic Geography in the USSR" (No. 11), and an article on "The Soviet Iron and Steel Industry" (No. 12).

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RTS 1895. A new press for preparing specimens of stabilized soil.
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GITEL'ZON, Ya. M. et al.
RTS 1837. The nitriding of E1723 and 15 Kh11MF steels for high temperature operation.
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KRYUKOV, V. V.
RTS 1849. Principal factors determining the efficiency of turbocharging in two-stroke engines
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KHIMICHESKIE VOLOKNA (Chemical Fibres)

ROZENBERG, A. Ya. & VLASOVA, G. N.
RTS 1877. Determination of sulphate ions by direct titration with Alizarin S.
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KINETIKA i KATALIZ (Kinetics and Catalysis)

KRYLOV, O. V. & FOKINA, E. A.
RTS 1844. Tracer study of the surface inhomogeneity of oxide catalysts for the decomposition of isopropyl alcohol.
1 Calcium Oxide.
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ENIKEEV, E. Kh. et al.
RTS 1845. The modification of catalysts for the oxidation of hydrocarbons.
1960 1(3) 431-439 22s. 6d.

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RTS 1875. Production line for automatic ice cream manufacture.
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TEPLOENERGETIKA (Heat and Power Engineering)

NIKOLENKO, I. A.
RTS 1767. The volumetric expansion of boiler water with different constituents in solution.
1960 (8) 71-74 7s. 6d.

TRUDY VSESOYUZNOGO NAUCHNO-ISSLEDOVATEL'SKOGO INSTITUTA PO PERERABOTKE SLANTSEV (Transactions of the All-Union Scientific Research Institute of Shale Processing)

SKRYNNIKOVA, G. N. & MATVEEVA, N. I.
RTS 1850. The determination of phenolic and acid hydroxyl in shale tars by high frequency and potentiometrictitration.
1959 (7) 282-293 25s.

UCHENYE ZAPISKI MGU: ZOOLOGIYA (Scientific transactions of the Moscow State University:) Zoology

SIGRIANSKII, A. M.
RTS 1839. Granary mites as vectors of diseases of agricultural crops.
1940 42 167-177 25s.

ZAPISKI LENINGRADSKOGO GORNOGO INSTITUTA (Transactions of the Leningrad Mining Institute)

ZVYAGIN, B. M.
RTS 1860. The general theory and methods for calculating the results of crushing minerals and subsequent gravity concentration.
1958 36(3) 43-64 50s.

BOOK EXTRACT

"Voprosy teploobmena" (Problems of heat exchange), edited by M. A. Mikheev. M. 1959.
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MINASHIN, V. E. et al.
RTS 1874. Micro-thermocouples used for research on heat transfer.
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OPENING ADDRESS OF THE PRESIDENT OF THE ACADEMY OF SCIENCES OF THE USSR ACADEMICIAN A. N. NESMEYANOV

*Vestnik Akademii nauk SSSR, 1961 (3) 4-11

During the year that has elapsed since the last general meeting of the Academy of Sciences of the USSR we have lost 18 of our fellow members.

On the 22nd April there died Vladimir Petrovich Bushinskii, Correspondent-member of the Academy of Sciences of the USSR, specialist in soil science. On the 12th May we lost Viktor Anatol'evich Florin, Correspondent-member of the Academy of Sciences of the USSR, a prominent specialist on hydraulic engineering and soil mechanics. On the 16th May the noble artist and great worker in the field of the history of the arts, Academician Igor' Emmanuilovich Grabar' passed away in his 90th year. On the 9th June there died Correspondent-member of our Academy Semen Alekseevich Lavochkin, the twice honoured Hero of Socialist Labour and constructor of many Soviet aeroplanes. On the 14th July there died Valentin Ivanovich Kovalenkov, Correspondent-member of the Academy of Sciences of the USSR, one of the older Russian scientists, a well-known specialist on line communication and inventor of many important devices in this field.

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On the 1st of August there died yet another outstanding scientist, Academician Nikolai Sergeevich Shatskii, who has made a great contribution to geological science. On the 26th of August there died Correspondent-member of the Academy, Anatolii Fedorovich Kapustinskii, who carried out a series of original investigations in the field of inorganic chemistry and chemical thermodynamics. On the 5th September there died the outstanding Academician Iosif Adol'fovich Trakhtenberg, author of many works in the field of economics. On the 25th September there died Correspondent-member of the Academy of Sciences of the USSR Viktor Arsen'evich Nikolaev, known for his works on geology and petrography and, above all, on the geology of Central Asia.

On the 6th October there died Academician Aleksandr Aleksandrovich Skochinskii, Hero of Socialist Labour, a great specialist in the field of mining science, founder of a Soviet school of subterranean aerology, and author of a large number of theoretical and experimental works.

On the 14th October the life of Abram Fedorovich Ioffe, our oldest fellow member, elected to the Academy as early as 1920, suddenly ended. He was a Hero of Socialist Labour and one of the greatest and most outstanding workers in Soviet science, known all over the world for his fundamental investigations in many fields of physics.

On the 22nd October there died Correspondent-member of the Academy Mikhail Aleksandrovich Arzhanov, who has enriched by his work Soviet jurisprudence. On the 30th October there died Correspondent-member of the Academy of Sciences of the USSR Petr Fedorovich Antipin, an outstanding metallurgist, under whose

guidance the first aluminium and magnesium factories in USSR were planned. On the 3rd November the great entomologist, Correspondent-member of the Academy of Sciences of the USSR Vladimir Veniaminovich Popov passed away.

In the current year, on the 15th January we lost our Correspondent-member of the Academy of Sciences of the USSR Nikolai Konstantinovich Pshenitsyn, who had done much in the field of inorganic chemistry, particularly in that of the platinum metals. On the 24th January there died Correspondent-member of the Academy of Sciences of the USSR Oleg Dmitrievich Levitskii, an outstanding specialist on the geology and origin of rare metal deposits and the metallogenesis of Eastern USSR. On the 28th January there died Correspondent-member of our Academy Veniamin Isaakovich Veits, one of the leading Soviet scientists in the field of power engineering.

Only just before our meeting, another sad news arrived: Academician Iosif Abgarovich Orbeli died to-day after a prolonged illness. He was a great scholar in the field of the philology, the history and material culture of the Near East, particularly of Transcaucasia. For many years he was Director of the State Ermitage, where he built up an Eastern department with valuable collections.

Let us stand in honour of the memory of the dead members of the Soviet Academy of Sciences. (All rise.)

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To-day we are to hear a report, considered and approved by the

Presidium of the Academy of Sciences of the USSR, on the activities of the Academy of Sciences during 1960. I should like to make some comparisons which may help to give the necessary background to this report.

Such comparisons are necessary in order to illuminate the path of the prospective planning of the development of science in harmonious agreement with the prospective planning of the whole national economy. It is important to be clear as to where we are, and in what direction we have to go, in order to attain the aim. Our aim is the full satisfaction, from the point of view of science, of the growing requests of the national economy and culture in accordance with the approach to communism. Our aim is to help the Communist Party in every way to put its decisions into practice, to work together daily with the communist construction to fulfil the science side of the decisions of the Plenums of the Central Committee of the CPSU. Our aim is such a development of science that in all decisive and important sectors it would occupy the very first place in the world, as has already been accomplished for instance, by the break-through into space.

Although in science, possibly more than anywhere else, the qualitative side predominates over the quantitative, even the latter possesses its own importance.

In 1959 the scientific workers of the country numbered 310 000, of whom 145 000 were in higher educational institutions. The annual increase in recent years of scientific staff amounted to about 9%; to-day the number of scientific workers already exceeds 350 000; during 10 years it has more than doubled. The numerical growth of membership of the Academy of Sciences of the USSR has

proceeded more rapidly, notwithstanding that, during these years, our Academy has, by its own efforts, helped the growth of a number of Academies of the republics of the Union, and transferred to them whole groups of scholars. In the course of 10 years the number of scientific workers of our Academy increased from 7600 to 23 000. The annual growth varied from 9 to 15%. At present there are working in the Academy 161 Academicians, 369 Correspondent-members, 1362 Doctors, and 7618 Candidates of Science (from a total of 10 500 Doctors and 95 000 Candidates in the whole country).

During the last years, the part of the Academy of Sciences in the whole of Soviet science amounted to about 6.5% in staff and to 8% in the budget grant.

At the present time, there are in the country about 3500 independent scientific institutes of various types, of which 1600 are scientific research institutes or equivalent establishments. Of these there are 160, i.e. 10% in the Academy of Sciences of the USSR.

In the course of 10 years, 31 institutes have been organized in the departmental system of the Academy, and a further 41 in the Siberian division and its branches.

Here are some of these great new institutes that have taken up a responsible position in the Academy of Sciences of the USSR and in the country, and have already made a useful contribution to science.

In the Department of Physico-Mathematical sciences we can mention the Institutes of High Pressure Physics; Acoustics; Semiconductors; Applied Geophysics; Terrestial Magnetism, Ionosphere, and Propagation of Radio Waves; Physics of the Earth; and Physics of the Atmosphere.

In the Department of Chemical Sciences - the Institutes of Elemento-Organic Compounds; Organic Chemistry in Kazan; Electrochemistry; Oil-Chemical Synthesis; Chemistry of Natural Compounds.

In the Department of Biological Sciences - the Institutes of Biological Physics; Evolutionary Physiology; Cytology, Radiation and Physico-Chemical Biology.

In the Department of Geological and Geographical Sciences - the Institutes of Geology; Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry; Mineralogy, Geochemistry and Crystal Chemistry of Rare Elements.

In the Department of Technical Sciences - the Institutes of Radio Engineering and Electronics; Electronic Control Machines; and Electromechanics.

A series of Institutes established, particularly in recent years in the Departments of Social Sciences - the Institutes of World Economics and International Relations; Russian Language; Africa; Economics of the World Socialist System.

In the Siberian Division, I wish to mention the Institutes of Mathematics with a computing centre; Hydrodynamics; Theoretical and Applied Mechanics; Radiophysics and Electronics; Nuclear Physics; Automation and Electrometry; Thermo-Physics; Geology and Geophysics; Experimental Biology and Medicine.

The lion's share of the newly organized institutes falls on three departments: Physico-Mathematical Sciences — 7, Chemical — 5, and Biological — 6. An interdepartmental Institute of Scientific and Technical Information is in operation and has grown into one of our greatest and most productive institutes.

All our institutes still suffer from insufficiency of space, sometimes acute, in spite of the fact that by means of construction and in small, but all the same, significant stages of improvement and adaptation of existing institutions, we have succeeded in doubling our effective useful floor area.

By departments the picture is as follows: Physico-Mathematical Sciences - growth to 3.6 times, Chemical Sciences - 2.8, Geological-Geographical Sciences - 1.3, Biological Sciences - 1.4, Technical Sciences - 4.3, Historical Sciences - 1.4, Economics, Philosophy and Jurisprudence - 3, Literature and Language - 1.2 times.

Although, at the present time, a considerable number of our institutes are satisfactorily accommodated, we have also "horseless farms" - such as the institutes of Geography, World Literature, a number of biological institutes in Moscow, and the Laboratories of Hydrogeological Problems.

We are hoping to solve the greatest part of the problem of providing the institutes of the Academy with accommodation in the not too distant future. Hopes for this are not only given by the increasing capital endowments, allocated to us according to the plan, but also by the not too distant prospect of the completion of a number of new buildings in Moscow and other cities.

This does not save us from the necessity of transferring a number of institutes from Moscow, but here the position is none too good. The Forestry Institute has been transferred to Krasnoyarsk, the Institute of Marine Hydrophysics is transferring to Sevastopol'.

In order to be able to develop outside, but near, Moscow, those scientific institutions which are necessarily linked with the group

of Moscow research institutes, the Academy has begun the construction of a scientific township in Pushchin near Serpukhov. There, a radiotelescope is already constructed with its associated buildings, and the buildings of the Institute of Biophysics are being constructed in the current year; in the next year, we hope, a group of biological institutes. Near Leningrad there has been accomplished the construction of a very large division of the Physico-Technical Institute with unique equipment, which will serve also other institutes of the Academy. Koltushi (Pavlovo) and Pulkovo are also developing. Construction is going on in Kazan', Ufa and Sverdlovsk, on the Kola Peninsula, in the Apatit, but the most rapid tempo and the largest scale of construction of a scientific township is in Novosibirsk.

During the last 10 years, the Academy of Sciences of the USSR completed the change-over of its branches into Academies of the Republics of the Union. Now, the development of science in the republics of the Union depends mainly on the success of the activity of their Academies. The Academy of Sciences of the USSR needs to devote more attention to the foundation of scientific centres in the autonomous republics of RSFSR, and to the organization of great scientific research institutes, closely linked with the developing industries, in the most important industrial and economic regions of the country, and in the first place in Siberia, where this matter has already been well started, in the Far East, in the Urals and in Volga region. I would like to propose that after Novosibirsk and side by side with the future preparation for the building of great scientific township-centres in the regions mentioned, it is necessary even now to found departments of our basic scientific research institutes in such important industrial towns of the Volga region as Gor'kii, Kuibyshev,

Saratov and Stalingrad, in relation to the industry distributed there, in order that these departments should then develop, under the influence of the maternal institutes, into independent powerful institutes. I am not speaking of Kazan' and Ufa, and not at all of Svedlovsk, where in the form of branches of the Academy of Sciences, we have whole complexes of institutes whose development to full measure is also imminent.

For a long time we have suffered from difficulties with the publication of scientific works. We still do and, at the moment, particularly so far as the times of issue of the literature are concerned. But the typographical basis has already ceased to be the acute spot.

The publication of scientific literature rose from 13 948 authors' sheets* in 1950 to 72 800 in 1960, that is to 522 %. The publication of books increased 3 times, the publication of journals more than 9 times, - from 3655 to 33 232 authors' sheets. The number of journals increased from 40 to 101.

The volume of the publications of the Institute of Scientific and Technical Information is growing uninterruptedly. From 1953 to the present time, the volume of information placed in the Referativnyi zhurnal has increased to 42 times. In 1960, the number of items noted (abstracts and references) reached almost 700 000. The Institute has already accumulated more than 3 000 000 abstracts.

The publishing capacity of the press of the Academy of Sciences of the USSR amounts to-day to an extraordinarily large quantity - 60 000 printed authors' sheets per year.

The experimental possibilities of Soviet science are growing. We have complicated equipment, we investigate cosmic space on unique spaceships by means of wonderful automatic apparatus.

*of 40 000 characters including spaces and blank parts of lines, but excluding headings, page numbers and prefaces. - Ed.

At a number of points we have the possibility of working at temperatures very near absolute zero. We work at a temperature of thousands of degrees at hundreds of thousands of atmospheres' pressure. The Academy possesses design offices and workshops in the institutes. They have accomplished a series of original constructions of apparatus. But all the same, we are still a long way from having all the equipment and modern requirements of experimental work.

In essence, this question already relates also to the qualitative side of the development of Soviet science. We must certainly take note of the qualitative growth of our science, not only in the sense of its possibilities, but also from the point of view of the results achieved. Such an assessment is always much easier to be made after a long period and from a greater distance.

Atomic power stations and engines, isotopes in engineering and science, spaceships and lunar flights, the opening-up of periterrestrial cosmic space, long-distance cosmic television and radio communication; the establishment of experimental astronomy; the wide participation of USSR in the experimental investigations of the world of elementary particles and the results obtained therein; the discoveries in the field of cosmic rays; the opening-up and utilization of the already-existing semiconductor technology; the establishment of electronic computers and machine controllers, whose echoes already resound in science and life; synthetic crystals of various kinds, and instruments based on them; piezoelectrics, ferroelectrics, the texture of crystals of various kinds, hard crystals - corundum and ruby, finally the synthesis of superhard crystals; discoveries in the field of radiospectroscopy, the generation of high power electromagnetic oscillations, not to mention the outstanding theoretical works of theoretical

physicists and mathematicians.

In chemistry the attention of the investigators is concentrated on high-molecular compounds. The methods of synthesis of many valuable new polymers have been determined, and new processes for the preparation of monomers have been worked out. Already in progress is work on polypropylene, polyformaldehyde, enanth, pentone, carboxylate rubber, acryllic polyesters, new ion-exchange resins, polyarylates, and also polymerized materials with new electric properties, increased heat stability, etc. Work on stereospecific polymerization permits industry to begin the transition to new forms of synthetic rubber, not inferior in properties to the natural product.

New methods for the synthesis of various metallo- and elemento-organic compounds have been worked out and studied; numerous new types of substances have been prepared; for certain ones of these, very important applications have been found. The peculiarities of the new material allowed the drawing of certain fundamental conclusions of general significance for chemistry. Elemento-organic chemistry has acquired the features of a new independent chemical discipline.

In inorganic chemistry and radiochemistry, previously little investigated elements, and also new artificial elements, have been submitted to a wide and detailed investigation. Analytical chemistry has accomplished the present advance, having worked out the determination of insignificant micro-impurities of a substance, and by that, established a new kind of meaning of a pure substance.

In biology there are very extensive results in the domain of descriptive and field biology of fauna and flora, and also of soil science and agricultural sciences, making it possible to draw a number of conclusions and recommendations in the fight against erosion,

saltmarsh formation, in the field of trace elements, in the improvement of pastures, fodder for animal raising, in the fight against vermin and helminthes. However, the break-through into the next stage of biology will be on the borderlines between biology and physics and chemistry. It is therefore particularly pleasing to see the wider and wider introduction into biology of electronic calculating machines, of the microwave spectroscope, the X-ray structural analysis of biological structures, electron microscopy, ultraviolet and luminescence microscopy, and a number of chemical methods. The foundation of Institutes of Biophysics, Cytology, Radiation- and Physico-Chemical Biology, Evolutionary Physiology, Chemistry of Natural Compounds, the expansion of the Institute of Microbiology make this break-through possible in a higher degree. Particularly interesting are the results of work on the enzymology and biochemistry of cell elements, on the investigation of the structures that are transitions from the molecular to cells and tissues, on genetics, on the investigation of the electrical phenomena in the brain, on the discovery of the signals of electron paramagnetic resonance in nucleic acids and in active cells. The investigation of the automatics of the organism is bound up in these days, with the problems of the automatics of the mechanism.

The wide cycle of fundamental works has been completed in the field of the theoretical and practical problems of automation. In the field of metallurgy, the fundamental offsprings of the Institute of Metallurgy - the oxygen process and vacuum melting - have broken through to life. In the field of power, one cannot pass silently over the development, in the Academy of Sciences of the USSR of the scientific bases of the Unified Power System (UES) of the European parts of USSR. Starting from the techniques worked out for the selection of the fuel of the generating stations in the UES, the conditions of

greatest efficiency were worked out for the electric supply of the Ural Province from high-power condensation-type generating stations distributed near the fuel resources of Eastern Siberia and Northern Kazakhstan. These generating stations will join, by means of long-distance power lines, the UES of Siberia and the UES of the European part of USSR.

Important investigations, in recent times, have led to the study of the movement of bodies at high speed. The results of these investigations will make possible further progress in aviation.

In geological investigations, exact methods of analysis are being introduced and are spreading more and more widely: radiometry, mass-spectroscopy, geochemical and geophysical methods of investigation, aerial methods, methods of determing the absolute growth of mountain strata and minerals, experimentation on the reproduction of natural processes, etc.; the strictly geological methods founded on microstratigraphy and micropaleontology were further developed.

The great achievement of geology during these years is the significant raising of general geological studies of the territory of the Soviet Union, which has permitted, for the first time, the drawing up of compound tectonic and geological maps, and, thus, the geographical compound map of USSR.

A particularly important role of the geological sciences during these years was reflected in the foundation of the scientific basis of geological prospecting and in the discovery of various mineral resources. Let us remember that during this time, there were discovered and brought into working such important iron ore deposits as the Yakovlevskoe and others in the region of the Kursk magnetic anomaly, a deposit in the region of Turgaya, deposits of diamonds, petroleum and gas, non-ferrous and rare metals and other forms of useful

deposits.

Well-known are the achievements of our geophysics in the methods of prospecting for useful deposits. The new methods worked out are: deep seismic sounding, permitting the study of the structure of the earth's crust to a great depth, the correlation method, giving the possibility of solving with great accuracy many structural problems in the search for useful deposits, and the method of sounding by alternating electromagnetic fields for the solution, with great exactness, of structural problems of petroleum geology at a considerable depth.

The interesting results of our oceanographical expeditions on "Vityaz", the researches of Soviet scholars in the extreme North and in the extreme South of the globe - in the Antarctic - are already well known.

The conclusions which our economists have drawn from a serious criticism of the condition of economic science have brought the researches nearer to the practical planning of the national economy. A further activation of the science of economics is, however, needed. The time has come for the creation of an organizational framework, in fact, for the formation of a Department of Economic Sciences.

We must mention the advances of our historical science.

If historians have usually been reproached with insufficient attention to the investigation of Soviet society, they have, during the past years, considerably improved the position and prepared a series of valuable works on the history of USSR during the Soviet period. New directions of historical science have developed such as americanistics, africanistics, ethnographical investigations of the peoples of the North, and others who, until now, were almost unknown. A great achievement of the historians is the preparation of 9 volumes of the

10-volume "Vsemirnaya istoriya" (World History). There has appeared a series of fundamental works on the history of the countries of the socialist camp, and also on the history of the capitalist countries.

In the past decade, Soviet archeologists and ethnographers have done fruitful work. Among the achievements of our archeologists the astounding discoveries in the ancient Russian towns of Novgorod, Moscow, Kiev, Chernigov, etc., are well known. Notable are the archeological discoveries in Central Asia, in the Ural Province, in Siberia and, in recent years, in the Far East.

The deciphering in the USSR of the Maya script is of world-wide significance, and particularly, the employment of mathematical machines for it. The development of a new branch of science - tanguto science - began in 1960.

The achievements of Soviet linguistics are reflected, above all, in the successful investigations of the languages of the peoples of the Soviet Union, and in the establishment of descriptive standardized grammars and dictionaries of many languages. In this period, the Academy's grammar of the contemporary Russian language was published, also valuable works on the un-investigated or little investigated languages and dialects of our country, and also on foreign languages. The new scientific field of linguistic geography has been developed. Recently, the elaboration of applied linguistics has begun, the use of mathematical methods in language study, etc.

In the field of literature study the most notable results were achieved in the investigation of the history of literature. In particular, there has been completed a ten-volume "Istoriya russkoi literatury" (History of Russian Literature), many-volumed works on foreign literatures, fundamental investigations of the works of great writers.

All this is evidence that our science has successfully broken through to new stages, that the integral of science possesses no small positive magnitude, and that the significance of the Academy of Sciences of the USSR extends far beyond those 7 % that it occupies in Soviet science in terms of staff and materials. We ought to say, it is much more like a ferment than an ordinary metabolite.

In order to be such a ferment for all Soviet science, the Academy must in its fields of knowledge coordinate scientific activity. The general meeting established the basic problematics of the Academy - at the moment we count 100 leading problems. We have set up 80 scientific committees on the problems, and although, unfortunately, only half of them are actively and successfully working, even this already completely convinces us that the path we have chosen is right, and that the interaction of the executants founded on common beginnings is an essential and progressive step.

We can mention also the, at least partial, successes in the field of interaction of various scientific disciplines. Such "borderlines" are most important for the improvement of scientific affairs, and I have mentioned this more than once. The Presidium of the Academy of Sciences of the USSR has also been concerned about it; this is reflected in the organization of the series of institutes I have mentioned on the frontiers of the sciences.

Thanks to the construction and the ever growing use of fast acting electronic machines, and to the activity of our great mathematicians, a process of "mathematization" of science is going forward, and this is already strongly felt in chemistry and in the technical sciences, and will soon begin to make itself felt in biology. We must intensify this process by all means.

The interaction of physics, chemistry and biology is growing. Physics and chemistry certainly do not replace biology, but radically renew and elevate it. This process is already making intensive progress. Physicists - specialists in the field of the solid state, of magnetism, of high pressures - combine in their work with crystallochemists and with organic and inorganic chemists. The specialists on the chemistry of natural compounds form with the biochemists a united family.

Geophysics and geochemistry, too slowly perhaps, are fructifying geology. Mathematics and economics are finding a common language, although sometimes on the principle "my brother, my enemy". We have prepared a common ground for work in linguistics and mathematics. We must strive to strengthen this mutual contact of the sciences, and fight against the division of science into departments. We must unite in friendly and comradely work institutes that are near and far apart in their specialized subjects.

Before us there stands an enormous task - to bring our science to the first place in the world. It is evident that here our most difficult and responsible question is the qualitative and quantitative growth of scientific staffs. Here is our important task: to multiply, during the next ten or more years, the contingent of our scholars, to rejuvenate it, and to raise its potential.

Our duty is, above all, to be, in a high degree, both the ferment and the cement of Soviet science.

Our duty is to lead Soviet science to the 22nd meeting of the Party with new victories and suggestions, substantially influencing the prospective development of economics and culture in the coming years and decades. Our duty is to ensure to Soviet science the first place in the world in the very near future.

*PLANNING SCIENTIFIC RESEARCH AND THE PROBLEM OF SCIENTIFIC STAFF

+A. N. Kosygin

**Pravda, 15th June 1961, p. 3

The development of science and the use of the results of scientific research in the interests of the national economy have long been, in the Soviet Union, an affair of state affecting the fundamental interests of society as a whole.

The Communist Party and the Soviet government ensure rapid development of science and application of its achievements in the interests of the people by means of planning. Planning is used in science, as in economic development, to speed up the tempo. Success in the great task of building a communist society demands a considerable improvement in the organization and planning of scientific work, and the essential division of labour, specialization and co-operation must be effected.

The main deficiencies in the existing planning and administration of scientific work must be admitted to be:

Lack of the necessary co-ordination of scientific research work in this country. Scientific effort and material resources are not

*Extract from speech by A. N. Kosygin "For a closer link of Science with Life". - Ed.

+First Deputy Chairman of the Council of Ministers of the USSR and Member of the Central Committee of the CPSU. - Ed.

**NLL shelf mark: R01312. Holding: 1st January 1960-

being concentrated to a sufficient extent on the most important fields of science, and there is not the requisite concerted action in carrying out scientific investigations, constructional and experimental work. Often nothing is done to ensure that scientific investigations will progress without interruption until their introduction into the national economy.

Other evils are the duplication of work, overlapping and too great diversification, none of which are justified by the demands of scientific development.

The activity of the Academy of Sciences of the USSR does not entirely meet the demands of the present time. Until recently the Academy included a large number of branch institutes, which diverted it from shaping a policy on scientific issues, dissipated its efforts and resources on numerous scientific and technical problems and reduced its administrative influence on the national advancement of science.

The existing practice of planning science only for a given calendar period - a year or five years - cannot satisfy scientific workers and requires further refinement.

It seems to us that scientific development should be planned in a different way. Scientific research work should be planned from the outset in its entirety, that is, the material and financial requirements should be planned for the whole period until completion of the work, and the amount of work falling in each of the intervening planning periods should then be estimated.

Such a method of planning would increase the responsibility of scientific collectives and individual workers and make it impossible to carry projects over from one planning period to another, that is, to plan ab initio each time. It would give research workers scope for

initiative, avoid bureaucratic stratification in deciding questions of financial and material provision for scientific work and would shorten the duration of projects.

To be able to lay down the main directions of scientific advance requires insight into present scientific tendencies and anticipation of major revolutions in science and technology, and for this scientists of the first rank are required. Policy planning for scientific development means scientific work coupled with calculation of the staff and materials necessary for the conduct of scientific research. This means that scientists and scientific research organizations should take part in the planning of scientific work. At the same time any system of planning should encourage bold creative enterprise and extensive searching for new scientific achievements.

The form and content of the state plan for scientific research work must be carefully thought out in conjunction with leading workers in science and technology. In planning work of great economic significance, it is obviously necessary at the stage of experiment and construction to foresee all the subsequent stages: not only the investigation, testing, design and practical application of the results but also the corresponding material and administrative requirements of all these stages of the work.

The Central Committee of the CPSU have considered it necessary to effect a radical alteration in the system of directing the work of scientific research establishments.

A State Committee of the Council of Ministers of the USSR for the Co-ordination of Scientific Research Work has been formed.* It is to co-ordinate the work of scientific research establishments, to improve the planning of scientific research and the use made in the

*see NLL Translations Bulletin, July 1961, pp. 569 - 577. - Ed.

national economy of scientific and technological discoveries, and the suppression of unnecessary overlapping of scientific work.

The co-ordination of scientific research work is one of the primary administrative problems in the advancement of science and technology. Experience shows that the vast scientific programmes of to-day are unthinkable without wide and good administrative co-ordination of many laboratories and factories. Many of those here present are well aware what a great number of the most various scientific, technical and production organizations have taken part in nuclear research and in the construction of space rockets.

But however good the planning and co-ordination of scientific work may be, they are a small part of the rapid development of science and the intensification of its part in the building of communism. The success of anything depends on staff, and in science this is especially true. Special demands are made of people engaged in science, but it takes a considerable time to train them. We have numerous well trained scientists capable of successfully tackling scientific problems. And yet very much still remains to be done in the training of new scientific staff and the proper organization of their work.

In view of the continually growing part played by science in the development of the economy, it is of the first importance that we should improve the training of scientists in the subjects of physics, mathematics, chemistry, and the branches of science relevant to complex mechanization and automation of production and to precision instrument making. We must have a well-thought-out master plan for the training of scientific staff for research stations in the principal regions of the country.

The question of the selection of staff for science is of vital significance. The successful development of scientific work throughout the

country depends to a considerable extent on how scientific workers are picked and how well their work is organized.

The recruitment of staff for scientific research institutes is made partly from among people in industry with experience of production and an adequate theoretical training, and partly from school- and college-leavers and post-graduate students.

It must be admitted that the selection of staff for scientific establishments is still poorly arranged.

More decisive steps should be taken to transfer specialists working in industry, taking into account their experience of production and their aptitude for creative research. They could be of great value in furthering the progress of science and technology and the improvement of production techniques.

The existing system of staffing scientific establishments with young specialists who have just left school or college does not always give good results, inasmuch as it does not make sufficient provision for spotting and taking on young people who have shown their abilities on the job, but have also a real aptitude for scientific work. Consequently people often find their way into science who do not possess the necessary abilities and they occupy places in scientific establishments without making any useful contribution to the work in hand. They come not to devote themselves whole-heartedly to research in the interests of the country, but so as to make it easier to prepare and defend their dissertations, and to acquire academic degrees. Unfortunately many candidates' - and even doctors' - dissertations have not benefited the country and just lie on the shelves in the archives.

It is essential for candidates' and doctors' dissertations to be considered first and foremost from the point of view of their value for

theoretical studies or for practical application. We must put an end to the state of affairs in which writing and defending a dissertation is an end in itself. A dissertation should be a piece of work which in greater or less degree will contribute to a step forward in science or technology. It should as a rule be the the final stage of a set period of practical work in a concrete branch of science.

Already when the subjects for dissertations are being approved the set task should include the application of scientific research results to everyday practice. In short we must gradually raise the standard of dissertations so that they become really scientific works, of value to the national economy.

The chief criterion of the usefulness of scientists' work should be its value to the people: this is the true yardstick by which scientific work should be measured.

People in this country are often judged not by their real achievements and knowledge, but only by their academic degrees and titles. As we all know, one of the cardinal principles of socialism is that everyone should work according to his abilities and be paid according to the work he has done. These principles should be put into effect when recruiting scientific staff, when making use of their work and when paying them for it.

We should make it a strict rule that, if a specialist has not the qualifications for scientific research and is not capable of the work, he should not be left for long within the walls of such an establishment. The possibilities of growth in other surroundings should be pointed out to such a man, especially in industrial or agricultural undertakings, where he can do more useful work compatible with his talents.

A monopoly by any individual or group in the field of science

is absolutely intolerable, and so is any attempt to interfere with scientific criticism and self-critism or with the creative discussion of important theoretical questions.

In many institutes scientific effort is assigned without due consideration of the importance of concentrating it above all on solving the tasks of most importance to the national economy.

We sometimes make extremely unscientific use of our scientific resources. Scientists spend a lot of time on miscellaneous preparatory work which could quite well be done by qualified technicians and assistants. Those in charge of scientific establishments should look into ways of ensuring the right allocation of work to senior and junior staff. The results achieved by a scientist in his work depend on proper use being made of his knowledge, his abilities and his experience.

In the organization of scientific research work in scientific establishments the creative activity and initiative of the scientists should be combined with a deep consciousness of their duty to society.

The doors of science must be wide open to gifted people who have proved their worth in practical work. In science we need people who, having the necessary ability and inclination, are ready to give all their energies to this creative search.

The selection of young specialists for work in scientific establishments should begin while they are still at school or college. Scientific research and experimental methods must receive more emphasis in higher educational institutions, to train students for scientific work. If in the course of their education they can conduct suitably arranged scientific research work, and if the principals, professors and teaching staff pay more attention to the discovery of students' inclination to an ability for scientific research work, then the task of

selecting young specialists for scientific work will be more successful.

It is important that there should be a closer link between the workers in scientific establishments and industrial concerns. A scientist will often want to verify or finish off his investigations in a works laboratory or design office, while for some people from the works it will be important to complete under research laboratory conditions projects begun in the works.

The Soviet state is devoting large sums of money to the development of science in this country. Whereas 874 000 000 roubles were allocated to science in 1950, the figure had grown to 3 260 000 000* in 1960 and will be more than 3 800 000 000+ in 1961. It is a question of using the means provided by the state in the most appropriate and effective way for the good of the national economy.

Unfortunately not a few of the scientific establishments do not reach the required standard of scientific research. They owe a heavy debt to the government. At the same time we often hear statements that the funds allocated to particular scientific establishments are inadequate.

It should be remembered that the funds allocated to various sectors of our economy and to science are governed by the objectives set for the current planning period. We cannot increase capital investment above the amount budgeted for in the plan unless the government either receives extra revenue from other sources, or makes cuts in the financing of industry, agriculture and other sectors of the economy.

If it can be shown that supplementary grants to science would justify themselves within a short period by new improvements in production, the state can advantageously divert funds from other sectors to science, and this will be justified. If the supplementary

*£1 294 000 000 at the official rate of exchange (£1 = 2.52 roubles). -Ed.
+£1 508 000 000 - Ed.

grant will ensure a financial advantage, it will be an economic proposition. This means that any increase in the amount allocated to science is in the hands of the scientists, for it entirely depends on the return which an investment in science would give compared with an investment in increasing capacity in the corresponding sections of industry at the existing level of technical development.

In the advancement of science and technology an important part should be played by collaboration and exchange of scientific achievements among the countries of the socialist bloc. There are many problems on which scientists could join forces so as to solve them more quickly. In the socialist world there is no such thing as a monopoly of a scientific discovery by any particular country. Any invention or discovery made in one of the socialist countries can be utilized in the others, free of charge. This is one of the greatest advantages of socialism.

The latest achievements of science and technology are of equal interest in both capitalist and socialist countries. We have however not made good arrangements for the mutually advantageous exchange of licences and inventions with capitalist countries. Good arrangements for patenting Soviet inventions in capitalist countries, and the proper buying of licences in those countries for inventions of value to the Soviet economy, can make a great contribution to more rapid scientific and technical development and can save much time and effort in relation to a number of scientific and technical problems.

It is essential for our scientific research institutes to know more about developments abroad. But at the same time scientific and technical institutes should, right from the beginning of work on scientific and technical problems, bear in mind the possibility of

patenting and selling our licences abroad. This in turn could provide supplementary funds for the purchase of foreign licences.

The initiation and extension of scientific and technical exchanges with capitalist countries does not of course depend entirely on us. As we know, many influential circles abroad put obstacles in the way of such links. But we on our side will try to strengthen and develop international scientific and technical exchanges in the interests of peace, of progress, of the good of all mankind.

The development of scientific contacts and international scientific and technical exchanges will lead to the mutual advantage of the scientists and to scientific and technical progress and without doubt will hasten the solution of important problems in science and technology.

Contemporary science has little in common, as regards its methods and its resources, with science in the last century or even at the beginning of this century. The leading areas of science are becoming increasingly industrialized. Mighty and complex apparatus, electronic devices, precision instruments and equipment, are being used more and more widely in scientific investigations.

With the introduction of more sophisticated production processes the industrial sector institutes have been obliged to resort to the creation of special laboratories. For example, independent mechanical engineering laboratories are setting up laboratories for chemistry, electrical engineering, remote control, automation and many others. It seems to us that it is not always appropriate for institutes to sprout numerous laboratories in this way.

It would be a good idea to consider setting up, in large towns where there are several scientific establishments, special centres on the pattern of the Computing Centre of the Academy of Sciences of the USSR to serve the scientific establishments with, say, calculations

and other work of a general nature.

An important prerequisite to ensure that the best value is obtained from scientists' work is full and timely information on the state of knowledge in specific fields of science. Scientists should be well informed about what has already been done in a given field here and abroad, so as not to waste effort on problems that have already been solved. All this should have an effect on increasing the productivity of the scientists.

The most important question for the co-ordinating bodies is to settle the area of specialization of the various scientific centres, delimiting their activities so that institutes would be able to work on appropriate orders, agreements and contracts, ensuring that special problems would be worked out by experts for the technological scientific research institutes of industry.

It goes without saying that this work is very complex. It takes some time, requires wide knowledge, and may even come up against resistance from certain heads of institutes who are used to having everything in their own hands: their work may not be highly skilled or scientific, it may be not the latest achievement in science and technology but rather out of date - but it is their own.

The co-ordinating bodies for science should ensure a suitable re-organization of our scientific establishments. This will make it possible, with a minimum of expense, to give more authoritative and productive answers to the questions on which the rapid technical progress of our economy depends.

MEASURES FOR IMPROVING TRAINING OF SCIENTIFIC AND TEACHING PERSONNEL

*Ekonomicheskaya gazeta, 17th June 1961, p. 1

The Central Committee of the CPSU and the USSR Council of Ministers have adopted a decision on measures for improving the training of scientific and teaching personnel. The decision notes the fact that definite achievements have been attained in the USSR in scientific training; in the past 10 years the number of scientific workers has more than doubled.

The tasks connected with the construction of communism in the USSR call for the further development and improvement of the quality of scientific research and for extending and improving the training of scientific and teaching personnel.

At a number of scientific institutes and higher educational establishments, for instance, scientific research is lagging behind requirements, and there are serious shortcomings in the training and advanced studies of scientific and teaching personnel.

Scientists working at many higher educational establishments and scientific research institutes still do little research on the problems raised by industry and agriculture, and in conducting research on various problems insufficient attention is being paid to ascertaining the economic effect to be derived from it.

Scientific institutes and higher educational establishments have an insufficient number of Doctors of Science and Professors on their staff.

*NLL shelf mark: R019792. Holding: 4th July 1960-

Little has been done to attract outstanding industrial and agricultural specialists to teaching at higher educational establishments.

The majority of those who complete their postgraduate courses fail to defend their candidate's dissertations within the specified time, a fact which testifies to serious shortcomings in the organization of scientific work in postgraduate courses.

The higher educational establishments do little to improve the scientific knowledge of specialists working directly at enterprises and at collective and state farms; they fail to take a sufficiently active part in the selection of the best specialists to be trained as Candidates and Doctors of Science.

There are still shortcomings in conferring scientific degrees and titles.

The Central Committee of the CPSU and the USSR Council of Ministers have instructed the USSR Academy of Sciences and its branches, the republican Academies of Sciences, the USSR Ministry of Higher and Specialized Secondary Education, the USSR Ministry of Agriculture and the other Ministries and departments with scientific research establishments and higher educational establishments under their jurisdiction to eliminate these shortcomings in the organization of scientific research and in the training and advanced studies of scientific and teaching personnel.

Measures must be taken considerably to extend and improve scientific research which is of vital importance for the development of theory and practice and which ensures further scientific and technological progress, the generalization of the experience of communist construction in the country and the solution of vital scientific problems. On this basis, the training and advanced studies of

scientific and teaching personnel in accordance with the present requirements of the national economy are to be systematically extended and improved.

The decision points out that it is the duty of scientists to train worthy replacements.

The USSR State Planning Committee (Gosplan) is instructed to make provision in economic plans, starting with 1962, for an additional 1000 full-time research posts at higher educational establishments for faculty members working for their Doctor's degree on problems of vital economic importance or fundamental research. These posts are to be distributed by the USSR Ministry of Higher and Specialized Secondary Education among the Union republics, Ministries and departments with higher educational establishments under their jurisdiction.

Higher educational establishments will be permitted to release from teaching duties members of their staff who hold a Candidates degree and have submitted important research findings and plans for research work, approved by the higher school councils, on important economic and theoretical problems.

These persons are to be appointed senior or junior research workers for a period of two years to prepare for their Doctor's degree. They are obliged to report at the end of the year to their respective council, which will judge the results and decide whether they should continue working for their degree or return to their former teaching posts.

Higher educational establishments will be entitled, by agreement with the corresponding Ministries and departments, to transfer scientific and teaching personnel for a period of six months, with full pay,

to other higher educational establishments, research centres, industrial enterprises and organizations for research work, generalizing advanced experience and applying completed research.

The USSR Ministry of Higher and Specialized Secondary Education and the USSR Academy of Sciences, with the agreement of the USSR State Planning Committee, the Economic Council of the USSR (Gosekonomsovet) and other State Committees under the USSR Council of Ministers, have been instructed to proceed in their work from the need to meet the requirements for scientific and educational research personnel of higher schools, research centres, industrial and agricultural establishments and other organizations and to take into account the intensified training of this personnel - especially in new fields of science and engineering - when they approve the yearly enrolment of postgraduate in different specialists.

The decision stipulates that, in addition to existing privileges, postgraduates studying by correspondence can, at their request, be released from their main work one day per week for a period of four years of training, receiving half-pay for that day. In addition, factory and office executives will be allowed to give postgraduates, at their request, one or two days off per week without pay in the fourth year of their training.

Enrolment has been permitted in full-time postgraduate courses of students nominated by higher educational establishments, industrial enterprises, state and collective farms, research establishments and other organizations. Enrolment in postgraduate courses should be regarded as encouragement to the best specialists for good work. Persons sent to full-time postgraduate courses must have a record of at least two years of production work. Specialists finishing postgraduate courses are to return to the organizations which sent them

to these courses.

The decision instructs the USSR Ministry of Higher and Specialized Secondary Education and the Academy of Sciences of the USSR to work out measures for improved training of scientific personnel in postgraduate courses, with a view to ensuring that the majority of postgraduates complete their term of instruction with a Candidate's degree.

Persons who have passed the examination for a Candidate's degree in their given speciality will not have to take entrance examinations to postgraduate courses, but will have to present a paper in their chosen speciality.

The Higher Qualification Commission has the right to permit the councils of higher educational establishments and research institutions to consider on a par with theses presented for a Candidates or Doctor's degree, published works on new machines of original design which have been introduced in production, on original building structures already erected, or on the introduction of important changes in industrial technology.

Higher educational establishments are permitted to introduce the post of Consultant Professor on their staffs. These posts may be filled by Doctors of Science and Professors retired on pension who will assist in the training of scientific and teaching personnel.

The Higher Qualification Commission has been instructed to exercise greater control over the work of the councils of higher educational establishments and research institutes when qualifying scientific and teaching personnel. The Higher Qualification Commission is permitted, on the request of the organizations and administrations concerned, to appoint joint councils of higher educational establishments and research institutions, when necessary, to consider theses

presented for a Candidate's or Doctor's degree; these councils are to consist of the most highly qualified scientific workers and instructors.

The Higher Qualification Commission, in exceptional cases, has the right to exempt either completely or in part from the examination for a Candidate's degree applicants, primarily production workers, who present as their theses scientific research on the most pressing problems of the national economy.

*ON IMPROVING FOREIGN-LANGUAGE TUITION.

Anon.

+Ekonomicheskaya gazeta, 4th June 1961, pp. 1 and 3

The USSR Council of Ministers has considered the question of improving foreign-language tuition and has adopted a corresponding decision. The decision notes that for specialists in various fields of science, engineering and culture, and also for the working population throughout the country, a knowledge of foreign languages is most important for extending international ties and interchanging scientific and technical achievements on a broad scale.

In recent years foreign-language tuition has improved to some extent. It is given at all institutions of higher and specialized secondary education, at general-education secondary schools and at nearly all seven-year schools. The foremost schools and a number of higher educational institutions have made notable progress in foreign-language tuition. But there are still major shortcomings in this important matter.

Upon leaving general-education schools and higher and specialized secondary establishments, pupils and students have, for the most part, a poor knowledge of foreign languages. Because of their small vocabulary and purely formal knowledge of grammar, they are unable to translate foreign-language texts without dictionaries. They are

*Official USSR translation - Ed.

+NLL shelf mark: R019792. Holding: 4th July 1960-

particularly weak when it comes to speaking foreign languages. There are also serious shortcomings in the training of foreign-language teachers for secondary and higher educational establishments.

The USSR Council of Ministers has advised the Councils of Ministers of the Union republics, the USSR Ministry of Higher and Specialized Secondary Education and all Ministries and departments with educational establishments under their jurisdiction to take steps to remove the shortcomings in foreign-language tuition and fundamentally improve such instruction at secondary and higher educational establishments, the main aim being to give pupils and students a practical knowledge of foreign languages.

The Ministries of Education of Union republics and the RSFSR Academy of Educational Sciences must improve foreign-language school syllabuses and publish, in line with them, new textbooks within the next three to four years, making it their special concern that these textbooks should help to the utmost in instilling in pupils the habit of speaking in foreign languages and the ability to translate foreign-language texts without a dictionary; they must also provide for the publication of books for school-teachers and also readers conforming to the new textbooks.

The USSR Council of Ministers has decided that at general-education schools having qualified foreign-language teachers and adequate premises, classes in which there are more than 25 pupils should be divided into two groups for purposes of foreign-language study. Schools are advised to start implementing this measure in the fifth form, beginning with the 1961-62 school year, and it should be gradually completed within seven years. Provision is made for additional optional foreign-language classes, of two hours a week, to

be held for the ninth to eleventh forms of evening (shift) secondary schools having the qualified teachers and appropriate number of pupils.

The Councils of Ministers of the Union republics have been instructed to start in the course of 1961-65 at least another 700 general-education schools where several subjects are taught in a foreign language, and to improve foreign-language tuition at boarding schools. As from the 1961-62 school year, boarding schools having qualified teachers should switch over to classes conducted in accordance with the curricula and syllabuses of general-education schools where several subjects are taught in a foreign language.

Instructions have also been given that a minimum list of educational appliances and visual aids required for foreign-language teaching at schools must be drawn up and arrangements made for their manufacture, in order to ensure that in the next few years every secondary or eight-year school giving foreign-language instruction should have the necessary quantities of such educational appliances and visual aids. To this end, the USSR State Planning Committee and the Councils of Ministers of the Union republics must make provision in their annual plans for the allocation of the necessary appliances and aids for foreign-language tuition at schools.

The USSR Council of Ministers has recommended that the practice be stopped of having teachers of other subjects, with a poor knowledge of foreign languages, give tuition in foreign languages. Inadequately-trained foreign-language teachers are to be sent to advanced training courses or dismissed in accordance with the legislation in operation. In the latter case the necessary measures are to be taken to provide them with alternative employment.

In its decision, the USSR Council of Ministers provides for the

extension of the network of full-time and correspondence courses in foreign-language study for adults. It is recommended that the groups at such courses should consist of not more than 20 students. The RSFSR Ministry of Education has been instructed to publish the necessary textbooks and manuals for the students of foreign-language courses, taking into account the needs of the different Union republics.

The USSR Council of Ministers has permitted the organization of foreign-language groups at kindergartens and in the lower forms of general-education schools should the parents desire this. The RSFSR Ministry of Education and RSFSR Academy of Educational Sciences have been instructed to publish syllabuses and manuals on methods of foreign-language tuition in such groups.

The USSR Council of Ministers has instructed the Councils of Ministers of the Union republics and the USSR Ministry of Higher and Specialized Secondary Education to improve the training of foreign-language teachers for schools. With this end in view, they have been advised to improve curricula, syllabuses and textbooks for universities and teachers' training colleges specializing in the training of foreign-language instructors, to pay more attention to giving language practice in schools and students' classes, and to ensure that higher educational institutions are equipped with the necessary appliances and visual aids for foreign-language teaching.

Obligatory classroom lessons in foreign languages for the majority of higher educational establishments will total not less than 240 hours. Facilities for optional studies of foreign languages will also be provided. It is also proposed to encourage in the higher educational establishments extra-curricular activities in foreign languages and to organize courses for students who wish to improve their knowledge of foreign languages. The Ministry of Higher and

Specialized Secondary Education of the USSR has been instructed, within two months, to make the necessary changes in the curricula of the universities, above all in the humanities, in order to ensure that graduates have a free command of the language studied.

In the higher educational establishments training foreign-language teachers the number of students per group for practical lessons in a language should not exceed 7 to 10, and for all the other higher educational establishments 12 to 15.

The Ministry has been instructed to settle the question of the number of hours a foreign-language teacher of a foreign-language institute of faculty will teach, taking full account of the special importance of this subject and the need to discontinue the practice of overburdening the teachers.

The Council of Ministers of the USSR has instructed the Councils of Ministers of the Union republics and the Ministry of Higher and Specialized Secondary Education of the USSR to organize at the universities and teachers' training institutes, starting with the 1961-62 academic year, the training of teachers in general educational subjects for work at schools where a number of subjects will be taught in foreign languages.

The Ministry of Higher and Specialized Secondary Education of the USSR will have the right, when necessary, to extend by a year the period of training of these specialists.

It has been proposed that at some of the leading teachers' training institutes of foreign languages and universities two-year advanced pedagogical courses be organized for training highly qualified foreign-language teachers for higher educational establishments. These courses will admit, on a competitive basis, persons with a higher education who know a foreign language to the extent required by the

programmes of foreign-language teachers' training institutes. The students attending these courses will pass a qualification state examination for teachers of foreign languages at higher educational establishments.

The students of these advanced pedagogical courses will receive the same grant as postgraduates and as a rule will be given posts as senior teachers at higher educational establishments. When an assistant professorship is conferred on these teachers the fact that they have graduated from these courses will be taken into account.

The Council of Ministers of the USSR points out that in the practice of schools there is a certain disproportion in the foreign languages studied. The specific features of the Union republics in the selection of the languages to be studied at schools and higher educational establishments are not taken properly into account.

The Councils of Ministers of the Union republics and the Ministry of Higher and Specialized Secondary Education of the USSR have been instructed to establish, within three months, the most advisable relationship in the foreign languages to be studied at schools, specialized secondary and higher educational establishments and also to provide facilities for the study of the most widespread languages of the Asian, Latin American and other peoples.

The Council of Ministers of the USSR has proposed that there should be an increase in the issue of foreign-language study films for schools, specialized secondary and higher educational establishments, and that ordinary and long-playing records and sound films should be put out for foreign-language students. It is also envisaged that the radio and television will be employed more extensively for foreign-language studies.

The Ministry of Culture of the USSR and the State Committee for Cultural Relations with Foreign Countries have been instructed by the Council of Ministers of the USSR to increase the output for foreign-language students of dictionaries, phrase books, books and pamphlets with stories, and the best examples of contemporary and classical fiction in the English, German, French and Spanish languages, both in adapted and original form.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the National Lending Library for Science and Technology, Boston Spa, Yorkshire. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the National Lending Library.

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SPINKS, J. W. T.: "Moscow Impressions - 1960".
Unpublished report by author at the National Research Council, Canada.
(Report of a private visit as a tourist to Russia in the summer of 1960. Places visited included Semenov's Institute, the Timiryazev Agricultural Institute, Moscow University. General (non-technical) impressions only are reported.)
NLL shelf mark: V 121

BOTANY

SHEBESKI, L. H.: "Personal Impressions of a visit to the USSR under NRC - Soviet Academy of Sciences Exchange Agreement."
Unpublished report by author at the University of Manitoba, Canada.
(Excerpts from letters written during a visit to the USSR from 6th June to 31st July, 1960. Institutions visited included in the Moscow region: the Laboratory of Artificial Climate, the

Institute of Plant Physiology, the Institute of Biochemistry, the University of Moscow, the Gorki-Leninski Experiment Station, the Institute of Genetics, the All-Union Zonal Laboratory, the Institute of Medicinal and Pharmaceutical Plants, a collective farm in the Krasnador region, the State Experiment Station at Snigiri, the Timiryazev Agricultural Academy; in Leningrad; the Komarov Botanical Institute, the All-Union Institute of Plant Cultivation, the Department of Genetics of the University of Leningrad; in Odessa: the All-Union Institute of Genetics and Plant Breeding; in Yalta: Nikitsky Botanical Garden; in Kiev: Experiment Station (Botanical Institute), All-Union Institute of Sugar Industry, Ukranian Scientific Institute of Pomology, Ukranian Institute of Plant Physiology, Ukranian Central Republic Botanical Garden, Botanical Institute, and the University of Kiev.)

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(A report of first United States Petroleum Industry Exchange Delegation to Russia from 2nd August to 31st August, 1960. Institutions visited included, in Moscow: the Institute for the Design and Construction of Oil Refineries, the All-Union Scientific and Research Institute for Oil and Gas Development; in Ufa: the Ufa Scientific Oil Research Institute; and in Baku: the Azerbaidzhan Oil Technical Institute. Tours were made to refineries at Novaya Ufa, Oktyabrsk, Novoe Baku, Baku (Karadag Neft) and Syzran near Kuibyshev; oil fields at Baku,

Zhirnovsky and Novo Kuibyshev. The Volga-Don Canal and the hydroelectric plant at the Stalingrad Volga Dam were also visited. A more comprehensive report is to be issued in 1961)

NLL shelf mark: V 111

FOREST PRODUCTS

JENKINS, J.H.: "Growth of the Forest Industry in the Soviet Union", Pulp and Paper Magazine, August 1958, pp. 107-110. (Report of team lead by J.H. Jenkins who made 7400 mile journey through the USSR in 1956 to study the forest industry. Report includes notes on Russian methods of administration in the industry. Institutes visited included the Central Research Institute for Mechanization, Procurement of Wood, and Woodworking Research in Moscow and the Central Research Institute for Water Driving and Rafting of Wood. There is also a review of developments in mechanization, and information on workers and their working conditions).

NLL shelf mark: V 118

BOOK TRADE

COLEMAN, E.M.: "An American Publisher in the USSR", The Bookseller, 8th April 1961, pp. 1548-1552.

(Report on visit to Russia in the summer of 1960. Institutions visited included Mezhdunarodnaya Kniga, The Foreign Literature Press, thirteen other publishers of scientific and technical material, and the publishing house of the Academy of Sciences of the USSR in Leningrad. Another aspect of the visit was the study of the mass book distribution system).

NLL shelf mark: V 119

FURNITURE MAKING

MERRICK, M.J.: "A study tour of the USSR Furniture Industry". Furniture Development Council, 2-4 Dalmeny Avenue, London N.7. May 1961.

(Report on visit by 15 - man team from 10th - 23rd September, 1960. Institutions visited included, in Moscow: Furniture Combine No. 2; in Leningrad: the Ust - Izhorski veneer and plywood factory, Furniture factory No. 3; in Riga: "Furniers" plywood factory, and the First, Fifth, Sixth and Seventh Furniture Combines.

The report covers the design, manufacture, cost and retailing in the USSR furniture trade).

NLL shelf mark: V 117

N. L. L. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $ 16.00.

In addition to the accessions from the S. L. A. centre, N. L. L. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to National Lending Library for Science and Technology, Boston Spa, Yorkshire, and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from the National Lending Library, should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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Stal' in English, 1961 (4), published in July 1961, includes a paper on rolling with increased reductions. It is concluded that results of laboratory tests for determining the maximum angles of bite do not usually correspond to the actual conditions of rolling on blooming mills.

MISCELLANEOUS TRANSLATIONS AND SURVEYS

"Handbook of Soviet Alloy Compositions", published as PB 171331 by US Department of Commerce, OTS, Washington 25, D.C. 25th August 1959.

This 246-page handbook contains tables arranged in 12 parts: I. Steels; II. Al-, Mg-, Ti-alloys; III. Ni-base alloys; IV. Co- and Cr-base alloys; V. Cemented carbides; VI. Cu-alloys: VII. Soft metals and soft-metal alloys; VIII. Solders; IX. Precious metals and precious metal alloys; X. Ferroalloys; XI. Nonferrous primary metals; XII. Cast irons.

An index of alloy designations is appended.

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DEKORATIVNOE ISKUSSTVO SSSR (Decorative Art of the USSR)

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RTS 1889. The furniture of your home.
1961 (1) 43-45 7s. 6d.

ENERGOMASHINOSTROENIE (Power Machine Construction)

MIKHAILOV, O. N.
RTS 1869. Calculation of the natural frequencies of vibration of arrays of steam-turbine blading.
1960 (8) 22-26 10s.

IZVESTIYA AKADEMII NAUK SSSR: OTN (Bulletin of the USSR Academy of Sciences: Section of Technical Sciences)

ZAVALISHIN, D. A.
RTS 1888. New techniques for A. C. frequency conversion by means of valve converters and generators having a valve commutator.
1958 (8) 81-87 17s. 6d.

IZVESTIYA AKADEMI NAUK UZ. SSR: SERIYA FIZIKO--MATEMATICHESKIKH NAUK (Bulletin of the Academy of Sciences of the Uzbek SSR: Series of Physico-Mathematical Sciences)

ISMAILOV, M. I.
RTS 1790. On the theory of convective heat exchange during evaporation.
1957 (3) 47-62 40s.

IZV. VUZ: PISHCHEVAYA TEKHNOLOGIYA (Food Technology)

PETROSYAN, Ts. L.
RTS 1898. Nitrogenous substances of cognac spirit.
1960 (1) 144-145 5s.

PRIKLADNAYA MATEMATIKA I MEKHANIKA (Applied Mathematics and Mechanics)

BUGAENKO, G. A.
RTS 1884. On free convection in an inclined cylinder.
1954 18(2) 212-214 7s. 6d.

DRAKHLIN, E. Kh.
RTS 1885. The solution of the equations for a case of stationary heat convection in an infinite oblique circular cylinder.
1957 21(5) 693-695 7s. 6d.

PROMYSHLENNOE STROITELSTVO (Industrial Construction)

TRINKER, B. D. & PLUTENKO, V. P.
RTS 1893. The behaviour of reinforced concrete flue shafts carrying injurious gases.
1960 (2) 43-45 7s. 6d.

SELEKTSIYA I SEMENOVODSTVO (Selection and Seed Growing)

DOROFEEV, V. F.
RTS 1881. The role of adventitious roots in the resistance of wheat to lodging.
1959 (4) 70-72 5s.

TEPLOENERGETIKA (Heat and Power Engineering)

RATNER, A. V. & ARISTOV, M. Ya.
RTS 1846. Design of superhigh-pressure steam piping for strength.
1960 (9) 44-49 10s.

ZHURNAL FIZICHESKOI KHIMII (Journal of Physical Chemistry)

KARMILOVA, L. V.
RTS 1882. The problem of degenerative branching.
II The role of formaldehyde in the oxidation of methane.
1957 31(4) 851-864 35s.

ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA im. D. I. MENDELEEVA (Journal of the D. I. Mendeleev All-Union Chemical Society)

AVGUSTINIK, A. I.
RTS 1786. Cermets.
1960 5(2) 156-168 30s.

SHATALOV, A. Ya. et al.
RTS 1853. Investigation of electrical conductance in boric acid-ammoniaethylene glycol system.
1960 5(3) 346-347 5s.

BOOK EXTRACTS

BOOK
"MEZHDUNARODNYI GEOFIZICHESKII GOD: bibliograficheskii ukazetel literatury na russkom yazyke za 1954-1957 g. g." (The International Geophysical Year; bibliographic index of literature in the Russian language during 1954-1957), compiled by R. F. ZATRUTINA, Izd. AN SSSR, Moscow, 1958.
RTS 1612. Complete Book. 50s.

BOOK EXTRACT

"ISSLEDOVANIE PROTSESSA KOL'MATATSII PESKOV" (Investigation of the process of clogging of sand), Izd. M. Universiteta 1955 (LLU Shelf Mark R13713/0)

ORNATSKII, N. V. et al.
RTS 1882. Theory of clogging of a sand bed when a clay suspension is filtered through it. Chapter III 49-80: 163-180 50s.

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ON THE RESULTS OF SCIENTIFIC ACTIVITY AND THE APPLICATION OF COMPLETED SCIENTIFIC WORKS OF THE ACADEMY OF SCIENCES OF THE USSR IN 1960: REPORT BY THE CHIEF SCIENTIFIC SECRETARY OF THE PRESIDIUM OF THE ACADEMY OF SCIENCES OF THE USSR:

E. K. FEDOROV

*Vestnik Akademii nauk SSSR, 1961 (3) 12 - 26

In a report to the 21st Congress of the CPSU N. S. Khrushchev remarked that the foundation of the material and technical basis of communism requires the blossoming of science and an active participation of scientists in the solution of the problems connected with the further all-round development of the productive forces of our country.

The CPSU and the Soviet government are continually concerned with the development of science, establishing all the conditions for the fruitful work of the scientific institutions, laboratories, and institutes for the development of investigations in the most diverse fields of knowledge. This concern is also expressed in the systematic expansion of the activity of the Academy. In the year under report, 9 new institutes have been organized in the Academy, of which 6 are in the autonomous republics, in Siberia and in other regions. Buildings have been constructed for laboratories with total floor space of over 60 000 m^2. About 100 000 m^2 of housing accomodation has

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been handed over to the Academy's staff in Moscow.

In the year under report the Academy was reinforced by 1500 young specialists. At the present time, 23 000 scientists are working in academic institutes. In 1960 the total funds allocated (except capital investments) for the activities of the Academy of Sciences of the USSR were about 15% higher than in 1959.

The young scientists of the Academy of Sciences of the USSR presented 500 candidates' dissertations. Of the 84 doctors' dissertations the greater part, unfortunately, was submitted by elderly workers. Eleven new academicians and 50 correspondent members were elected.

For successes in scientific research work, 16 scientists of the Academy received the Lenin prize and 19 received gold medals and special prizes from the Presidium of the Academy of Sciences of the USSR.

The scientists of the Academy took an active part in the solution of problems linked with the further all-round development of the productive forces of the country.

In 1960 Soviet science won new great victories. The investigation of cosmic space continued and developed. There went into orbit the first spaceship - satellites with complicated flight control systems. The smooth landing of the second ship containing numerous experimental animals, marked a new step in the investigation of cosmic space.

Soviet science is developing rapidly. At the same time, the Central Committee of the CPSU and the Soviet government are continually reminding us of the need for further concentration of forces on the fundamental, important, directions of science, a rise of tempo in these investigations, a systematic improvement of the links

between scientific institutes and practical life. Much attention was given by the July 1960 Plenum of the Central Committee of the CPSU to the questions of the links between scientific institutes and industry.

In spite of the great achievements of Soviet science, much improvement remains to be desired in the utilization of its results in the national economy. This is the explanation of the still insufficient tie up of research work with the needs and requirements of industry, as well as the numerous difficulties and inadequacies in the application of scientific achievements to practical undertakings.

In a lecture to the January 1961 Plenum of the Central Committee of the CPSU, N. S. Khrushchev severely critisized the activity of a number of agricultural scientific institutes and once again emphasized the importance of the correct adjustment of scientific investigations, showing, that all industry must lean on science.

In the draft report of the activity of the Academy of Sciences for 1960, distributed to the members of the Academy, there are collected the details of all the important investigations and of their practical results. In my report, I shall attempt very briefly to describe the work completed in the Academy, by bringing forward only single examples.

New theories on the structure of the nucleus, based on the models of non-axial nuclei, have been elaborated by scientists specialized in the field of nuclear and atomic physics. The possibilities of investigations have been broadened: a new nuclear reactor for experimental research purposes has been brought to full power, together with a number of other large experimental installations. There has been worked out and constructed an effective microtron - an electron cyclotron.

Work on plasma physics is developing successfully. As result of the investigation of the parameters of the plasma, there has been established the presence, in the period of the discharge, of a considerable number of ions of high energy, the speeds of which do not depend on initial electric and magnetic fields. This indicates, apparently, the presence of an ion-accelerating mechanism by the electromagnetic fields of the plasma itself, and this may be of interest to astrophysicists.

This year, the first atomic ship in the world for peaceful purposes - the ice-breaker "Lenin" - made its first arctic voyage and showed the possibility of a wider use of the Northern sea route.

Important results were obtained in the investigation of cosmic space. The landing of a spaceship - satellite with a large number of experimental animals and various biological objects permitted us to obtain an enormous quantity of the most diverse date on the influence on the living organism of cosmic rays and other factors acting during the flight. Various physical observations were also carried out.

The analysis of the data obtained during the flight of the second cosmic rocket showed an increase of short duration in the number of multi-charged particles in the cosmic rays. Correlation was established between the appearance of these groups of particles and processes on the Sun.

Investigation of collisions of individual nucleons in the cosmic rays permitted conclusions to be drawn as to the presence of an internal structure in the nucleons.

In the investigation of cosmic space by radio-technical means, concentrations of coronary plasma were discovered in the neighbourhood of the Sun, moving parallel, approximately perpendicular to the radius, with speeds of the order of 1000 km/sec. At such a speed,

these concentrations must have an open trajectory of motion, but at somewhat smaller speeds these clouds of plasma might become natural satellites of the Sun.

A series of investigations on the heat radiation of the Moon in the centimetre and millimetre ranges has been completed. On the basis of these investigations, and also from the detailed study of the photographs of the reverse side of the Moon, many new data on the nature of the lunar surface have been obtained.

Work on the physics of solids has been continued. Investigation of the mechanical properties of iron deformed by fluid pressure has shown that with increase of the degree of preliminary deformation the residual strength of the metal greatly increases. The possibility of extrusion by fluid pressure of brittle metals and metals deformable with difficulty, such as beryllium, chromium etc., has been established. The use of high pressures and temperatures made it possible to obtain materials with new mechanical properties.

With the help of electronic paramagnetic resonance, the rupture of macromolecules of polymers under the action of mechanical stress was discovered. This has great significance for the elucidation of the question of the nature of the forces determining the strength of the polymers.

Interesting results have been attained in the study of semiconductors. For the first time, an exact theory of the dispersion of the current carriers and lattice vibrations in the case of degenerate zones was set up on the basis of a generalized method of the deforming potential.

Significant success has been achieved with the establishment of new types of highly productive equipment for the preparation of

liquid helium, and the separation and liquefaction of air. A test of the working model showed that the results obtained are of interest for the working out of large, efficient installations.

In the mathematical institutes there has been completed a series of investigations that has provided further development of mathematical methods, in particular of the bases of computer technique. Thus, a "language" for the description of the work of modern computors has been developed. The project of such a "language" was tried out in the description of the working of the machines M-2 and BESM-2.

Important investigations have been carried out in the field of geophysics. The study of the seismic characteristics and geological conditions of the origin of earthquakes has been completed for the seismically most active region of the USSR - Tadzhikistan. Similar studies of the relation of weak and strong earth tremors have great importance for the correct appraisal of the degree of earth tremor danger.

A new geotectonic conception has been suggested, based on the idea of the heating of the bowels of the earth by radioactive decay.

A method of objective analysis of meteorological data has been worked out and tested on the "Strela" computer. The scheme of computing uses information directly from telegrams of the meteorological stations, without first plotting the data on to a synoptic map.

The cycle of experimental investigations of the dispersion of sound at temperature inhomogeneities in the low layers has given the possibility of obtaining new data of the spectrum of turbulence in the atmosphere.

In our chemical institutes, in fulfilment of the resolutions of the 21st Congress of the CPSU and of the Plenums of the Central Committee of the CPSU, investigations have been widely developed in

the field of the chemistry of high-molecular compounds.

The methods of synthesizing of many new polymers have been determined, some possessing unusual electrophysical properties. In course of introduction is a series of new methods for the preparation of polymeric substances - basic products for the production of fibres, ion-exchange resins, rubbers, insulating coverings, important plastic components. Technological methods are being introduced for the preparation of acetic acid, methylethylketone, formaldehyde, ethylene, benzene and other basic products for the synthesis of polymers and of certain organic substances.

Theoretical work has also progressed. The theory of the microstructure of polymeric materials, particularly in relation to the problem of strength, has been developed. The investigation of the conductivity of polymers with conjugate bonds allowed the elucidation of the influence on these properties of anisotropy and their modification. For polymers possessing high conductivity and magnetic properties, there has been established a linear relation between the activation energy and the pre-exponent* of the conductivity. The theory of the particular phenomena of polymerization at very low temperatures has been further developed.

The International Symposium on Macromolecular Chemistry held in Moscow in 1960, brought about an exchange of experience between Soviet and foreign scientists.

During the investigation of elemento-organic compounds, a new type of tautomerism - metallotropism - was found.

The tests of a new non-poisonous, highly effective anti-detonator were successfully concluded.

New phosphoro - organic insecticides were established. Under

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* predèksponent - Ed.

the action of irradiation new polymeric phosphoro-organic compounds were prepared, which could not be prepared by ordinary methods of polymerization.

In the field of the chemistry of natural and biologically active compounds, the synthesis of extrone - one of the most important hormones - has been achieved, also that of the natural glycoside K-strophanthin, which has a wide medical application. Highly active preparations of pepsin have been obtained. A general method of synthesis and chemical investigation of a new group of natural compounds - the depsipeptides - has been worked out. An ion-exchange method has been introduced for the separation and purification of antibiotics.

It has been established that inhibitors of free-radical reactions possess the power of suppressing the biosynthesis of protein in tumor cells. New synthetic preparations with anti-tumor activity and preparations for protection against radiation are being investigated. Newly discovered, powerfully acting mutagens may be used in the selection of agricultural plants.

The very interesting phenomenon of a several tenfold rise of the magnetic susceptibility of dividing yeast cells, and a fall of it to the initial value after the completion of the division, has been discovered. This, apparently, opens up a possibility of controlling the process of reproduction by physical methods.

New methods of analysis, in particular radioactivation analysis, for the determination of micro-impurities have been developed. Substantial results have been achieved in the development of fuel cells - low temperature hydrogen-oxygen and solid electrolite cells.

Investigations on the chemistry of the rare elements were conducted successfully, in particular the study of the properties of their

simple and complex compounds. New economic methods for the preparation of a number of rare elements were suggested; new compounds of rare elements possessing valuable properties (as catalysts, enamels, etc.) were synthesized. Besides this there was, at first a need for extension of investigations for finding new fields of application of the rare elements.

Radiochemists have concluded the investigation of atomic nuclei formed by the irradiation of iron, antimony and bismuth by protons, and obtained a full table of the products of fission.

In geochemistry and hydrochemistry new ideas on the origin of the substances of the earth's crust have developed; an atlas of lithological-paleographic maps of the Russian plateau has been compiled; the first systematic investigations of the sediments of the Antarctic regions have been completed.

Other important results of our chemists also have great practical significance. Here belongs, for example, the new method of consolidation of porous materials by the application of low-frequency vibrations and employment of certain synthetic zeolites as so-called molecular sieves for the separation of mixtures of substances in industrial synthetic petroleum chemistry. New catalysts, inhibitors, heat-and moisture-stable coverings and other materials important for the development of a new technique have been worked out.

In the year under report the wide distribution of present-day methods of physics and chemistry in biological investigations has been continued.

An X-ray study and computation of the structure of the molecule of a protein - collagen - was completed.

It has been shown that, in the process of the enzymic splitting of adenosine triphosphoric acid, a considerable quantity of free

radicals arises. It is suggested that this has a direct relation to the energetics of muscular contraction. The synthesis of a polynucleotide from mononucleotides in drops of coacervate has been achieved. The localization of the enzymes in protoplasmic structures has been investigated, thus making the specificity of the cell organoids clear.

The physico-chemical basis of the primary, secondary and tertiary structures of high-molecular ribonucleic acid was given for the first time. The method of biosynthesis of a series of non-interchangeable amino-acids in plants was established. A new method has been worked out for the investigation of the micro-structure of living cells from their fluorescence in the ultra-violet range.

The significance of the radiation damage of monomolecular membranes for the activation of enzyme reactions has been shown.

For the first time, results were obtained on the existence in animal cells of a special supermolecular structure of desoxyribonucleic acid and the break-down of this structure immediately after the irradiation of the animal at the lethal dose.

Work has been carried out, establishing that in irradiated leaves of plants there are formed substances which block desoxyribonucleic acid, stop cell division, produce chromosome transformations, and inhibit the growth of malignant tumors in tissue cultures. The changes of the structure of the nucleus and of the cell membranes after irradiation have been demonstrated.

A series of experiments has demonstrated that by irradiation of seeds before sowing, it is possible to change the quality of the crop in the direction of increase of vitamin content and of sugars, and of improvement of the fibre.

It has been established that repeated and single irradiation of fruits by X-rays and fast neutrons, at an identical dose give the same damaging effect.

Great significance for the increase of the productivity of our cattle-raising attaches to the founding of a herd of hybrid cows at the "Gorki Leninskie" farm, giving milk with a high content (5%) of fat at abundant yields. The reverse crossing of hybrid bulls with the cows of the fat milk herd on this farm gave 25 quarter-blooded animals, which were distinguished by great weight, high milk yield, and again the same considerable fat content of the milk (5%). In order to check the pedigree properties of the animals of the "Gorki Leninskie" fat-milk herd, 90 bulls were sold to the agricultural farms of various territories and regions of USSR. There is reason to expect that, in this way, it may be possible to raise the fat content of milk in the Soviet Union from 3.6% to 4.5%, while maintaining high yields.

With the help of ultra-violet in radiation a mutant of the fungus Fusarium was obtained that forms more gibberellin than the original culture.

In the year under report the physical methods of study of higher nervous activity have considerably developed. It has been demonstrated, for example, that the visual analyser is an optimal coding apparatus structure. The role of a nucleus in the hypothalamic region, in the reflex regulation of blood pressure and the coronary circulation, has been shown. It has been established that the transport of organic substances from the photosynthesizing cells of the leaf to the conducting tissues depends on an expenditure of energy of macro-ergic phosphate bonds. A new property of plants has been discovered - their ability to react to the magnetic field of the Earth. Interesting results have been obtained showing that in vernalization a large quantity of gibberellin

is formed in plants.

Large-scale investigations have been concluded on the reclamation of soils in the Amur basin. Soil maps of Eastern Europe and Asia have been drawn up. A series of substantial handbooks and monographs on the flora and fauna of USSR has also been published or prepared for the press.

Scientists of the Division of Biological Sciences have worked out important recommendations for agricultural, medical and industrial practice: on the development and application of trace elements, on measures for the development of a pond industry, on creating new varieties of wheat-couch grass hybrids, on improving pastures and feeding crops, on the organization of the fight against midges, on the study of forest industry, etc. These proposals have been approved by the Presidium of the Academy, and submitted to the appropriate organizations. Some of these have already been realized.

Our geologists have continued the investigation of the laws of distribution of the most important minerals in the earth's crust as a basis for prospecting in the USSR.

It has been shown that the widely distributed hydrothermal ores and non-ore forms of mineralization are regularly formed in connection with the acid-base differential of solutions separated out by cooling magmas. The laws of tectonic control of mineralization have been elucidated, and this knowledge will allow us to give well founded forecasts.

The study of the principles of the formation and distribution of a number of non-metallic minerals in short supply and new forms of non-metallic minerals, laid the foundation for the expansion raw materials base.

The investigation of rare elements, in particular of the processes of post-magmatic metasomatosis, has led to the discovery of a new large deposit.

A series of maps of coal-bearings has been compiled, revealing the regularity of the distribution of the coal basins and of the deposits on the territory of the USSR, and giving a perspective evaluation of deposits of different age.

A method of quantitative statistical indices for the study of geological structures has been worked out. Practical recommendations were given for the exploitation of the Karadag oil and gas field.

A method for compiling tectonic maps of large regions has been suggested, and tectonic maps of Europe, Eurasia and the Arctic have been compiled. These works have already led to a reconsideration of certain fundamental ideas in general tectonics.

The methodological bases of stratigraphical subdivision and of the correlation of reef thickness have been laid, and the possibility (in principle) has been established of comparing the depth of open oceanic basins with the depth of epicontinental seas.

Hydrogeological investigations have made it possible to obtain new results on the dynamics and formation of subterranean waters in the deep parts of the West Siberian and of the Azov - Kuban artesian basins; the possible use, in a series of regions of USSR, of hot subterranean waters in the national economy has been estimated.

The basis of the theory of the physico-chemical processes of changes in rocks in the frozen state has been developed. It has turned out that the former prevailing assumption, that the frozen zone of the earth's crust is a zone of chemical inactivity, is not correct.

The first version has been compiled and published of a geochronological absolute time scale, according to data of the geochronological

laboratories of the USSR.

Our geographers have published a number of scientific monographs on the physical and economic geography of the USSR and of foreign countries; the first general geomorphological map of the USSR has been published.

The oceanographers have completed great combined research expeditions in the Atlantic and Indian Oceans and in the Mediterranean.

A map has been published of the new tectonics of the USSR on a scale of 1 : 5 000 000, the theory of convergent photography has been worked out, revealing the possibility of increasing the accuracy of photographic surveys from high altitudes.

Our scholars took an active part in the international geological congress, the international geographical congress, and the meetings of the International Union of Geodesy and Geophysics.

In the field of technical sciences, the most important scientific directions linked with the future technical progress of the USSR have been worked out. Thus, a large research project has been completed on the plan for the complete electrification of the country, and the prospective levels and tempi of the electrification of the USSR and USA have been compared.

A process has been studied of the conversion of coal into the plastic state. Theoretical and experimental investigations of the thermodynamic properties of the combustion products of fuels and other substances have been carried out and have yielded important results for the new technology.

A radiometric method for the separation of coal and rock has been worked out and, in cooperation with the industry, an automatic separator using gamma-radiation has been developed.

In the field of metallurgy and industrially important physico-chemical theory has been developed, for preparing metallic alloys of predetermined properties, in particular heat-stable alloys on the basis of a multi-component interaction of metals.

New titanium alloys with higher creep limits than pure titanium have been developed.

An electrochemical process of refining niobium to a high degree of purity has been suggested. Laboratory equipment has been set up for the zone refining of refractory metals with the aid of an electron beam, and for the first time monocrystals of pure refractory rare metals - molybdenum, tantalum, rhenium etc. - have been obtained.

In the field of radio technology and electronics new methods have been worked out for designing interference - stable communication systems, giving the possibility of increasing the efficiency of radio systems and of speeding up the transmission of information several fold. A sensitive radiospectroscope has been designed for the observation of paramagnetic resonance in the 3cm waveband; it permits the study of the spectra of paramagnetic absorption over a wide range of temperatures - from near absolute zero to above freezing point.

New cathodes possessing highly useful properties have been designed.

Considerable achievements were obtained in improving existing and developing new methods of automatic control. Thus, a theory has been developed of optimal control by objects with distributed parametres and this is important in continuous production processes in metallurgy, chemical industry and oil production. New results have been obtained in the elaboration of a theory of discrete systems

of an automatic type, containing digital computing units, and methods of investigating digital control systems have been established.

A series of small universal pneumatic units has been developed and put into production, from which various forms of automatic control systems can be assembled.

A theory of the construction of new discrete transducers* has been developed, which make it possible to build centralized control systems combined with digital computors.

Of great significance for our science was the first international congress on automatic control+, held in Moscow, where more than 800 foreign scientists from 29 countries took part.

In the field of mechanics, asymptotic methods have been developed for the solution of certain problems of the theory of vibrations of elastic bodies, which enable us to calculate the spectrum of the free vibrations of an elastic body and the forced vibrations of such a body under external loads. A method is given for the determination of the stresses arising on collision of the body with a compressible fluid, in the case where the colliding body suffers deformation.

The fundamentals of elasto-rheology and of the theory of porous bearings have been worked out, equations have been derived, special cases of which are the well known plane contact problems of the theory of elasticity.

A considerable number of investigations has been directed to the finding of new and the intensification of existing processes in metallurgy, mining and mechanical engineering. For example, there has been elaborated an original construction of a combined drilling tool. The parameters have been established for a high-power swing-chute with a length of jib of 180m.

*or sensing elements - Ed.
+IFAC congress - Ed.

For various geological conditions of mining, a theory has been worked out of the application of excavation techniques for mining minerals without the participation of human beings.

The possibility has been shown of constructing electrically-driven percussion machines, in which the kinematic part is protected from impulse loads.

Turning to the social sciences, we may notice the work of the historians, an important place in which is occupied by the compiling of works exposing the bourgeois and revisionist falsifications in this field, elucidating the general questions of historiography.

Considerable attention has been devoted, during the year under report, to the writing of general works, in particular, the many-volumed "Vsemirnaya istoriya" (World History). Volume 7 has appeared, and volumes 8 and 9 of this collective work are in the press.

The preparation has been continued of the large "Istoriya SSSR (s drevneishikh vremen do nashikh dnei)" (History of USSR (from ancient times to the present day)), five volumes of which are devoted the history of Soviet society. The Kazan branch has published volume 2 of the collective work "Istoriya Tatarskoi ASSR" (History of the Tartar ASSR), covering the Soviet period. In the series "Narody mira" (Peoples of the World) the collective work "Narody Severnogo Kavkaza" (Peoples of the Northern Caucasus) and the works "Narody Zakavkaza" (Peoples of Transcaucasia) and "Narody Srednei Azii i Kazakhstana" (Peoples of Central Asia and Kazakhstan) are in the press.

Among the general works on the history of foreign countries we must notice the appearance of the two-volume "Ocherki novoi i noveishei istorii SShA" (Outlines of the New and Most Recent History of USA), the collective work "Ocherki novoi i noveishei istorii Meksiki"

(Outlines of the New and Most Recent History of Mexico), and volume 3 of the "Istoriya Chekhoslovakii" (History of Czechoslovakia).

A large place in the scientific activity of historians, archaeologists, ethnographers and anthropologists is occupied by the elucidation of the general laws of development of human society in the early (the longest) stages of its history. For the collection of materials in the various regions of our country, about 30 expeditions have been made.

The raising of the level of our investigations owes much to the conducted scientific sessions, for example the general meeting of the Department of Historical Sciences, celebrating the 90th birthday of V. I. Lenin, and the sessions on the history of Siberia and on the history of Soviet historical science, etc.

For the 90th anniversary of V. I. Lenin's birth, several monographs were published, illuminating the role of Lenin in the development of Soviet society.

One of the most important problems of historical science is the investigation on the history of the peoples of Asia and Africa. The Institute of Asiatic peoples, founded in 1960 on the basis of the institutes of Eastern Studies and Chinese Studies, has published 146 works, a considerable part of which is devoted to the problems of the recent and newest history of Asiatic countries, their economic development, culture, international relations, and exposure of the colonial politics of the imperialistic powers. The African Institute is already functioning. It has prepared a series of informative materials and published certain scientific and popular books and pamphlets on the countries of the African continent.

A characteristic feature of scientific investigations in the field of the sciences of economics, philosophy and jurisprudence, was their

approach closer to the practice in communist construction. The possibility of increasing the rate of economic growth in the general prospects of development of the national economy has been studied; the norms of industrial accumulation, required for the provision of high rates of growth of industry have been substantiated; the level and the structure of national consumption has been determined; suggestions have been prepared on the questions of the development and improvement of government and collective farm cooperative ownership, with the object of establishing the conditions necessary for a transition to a unified public ownership in the USSR, and the overcoming of the existing differences between town and country. Suggestions have been prepared for the determination of the economic effectiveness of automation and mechanization.

Work has continued on the questions of the distribution of work in the world system of socialism. The problem of the economic competition of the socialist and the capitalist systems has been investigated. Questions have been studied of the methodology of accounting and of the comparison of the basic economic indices of the national economy of the USSR and of the capitalist countries.

In spite of the well known results obtained in recent years in the field of economics, it must be noted that, theoretical investigations lag behind the growing needs of communist construction. No scientifically based recommendations have yet been worked out as could render real practical help in a number of important problems of national economy. For example, on questions of price formation, the application of mathematical methods in national economic planning and the technical economic basis of the introduction of new technology. Investigations on these questions are not being carried out to a sufficient extent.

The efforts of our philosophers have been directed to the generalization of the enormous advances of the natural sciences. The collective works "Problema prichinnosti v sovremennoi fiziki" (The Problem of Causality in Modern Physics) and "Problema prichinnosti v sovremennoi biologii" (The Problem of Causality in Modern Biology), begun in previous years, have now been completed. The authors' work has been concluded on the collective publication "Filozofskie voprosy sovremennoi formal'noi logiki" (Philosophical Questions in Modern Formal Logic), in which most important questions arising in relation to the rapid development of mathematical logic are analysed, and the logical theories of neopositivism are submitted to critical analysis.

The major work "Filozofskaya entsiklopediya" (Philosophical Encyclopaedia) is being compiled, its first volume having appeared in 1960. Work has been finished on the publication of the universal "Istoriya filozofii" (History of Philosophy).

In the field of jurisprudence, there have been investigated, in the first place, questions of the development of the Soviet government, problems of the transformation of the socialist state into social communist self-government, and legal questions of technical progress. The work "Sovetskaya obshchestvennost' na strazhe sotsialisticheskoi zakonnosti" (The Soviet Public on Guard of Socialist Legality) has been published, the first volume of a course in international law has been completed.

The scholars in literature centred their attention on questions of the literature of socialist realism developed in close relation with the study of the classical heritage and with the investigation of general problems of literature. To the number of best-known works of the institutes of the Department of Literature and Language belong volume 1 of the "Istoriya russkoi sovetskoi literatury" (History of Russian

Soviet Literature), the works "Sotsialisticheskii realizm i klassicheskoe nasledie" (Socialist Realism and the Classical Heritage), "Sotsialisticheskii realizm v zarubezhnykh literaturakh" (Socialist Realism in Foreign Literatures), and a series of monographs.

Theoretical investigations of literary scholarship have deepened and widened considerably.

Among the finished works, there should be mentioned "Lenin i voprosy literaturovedeniya" (Lenin and Problems of the Study of Literature), "Teoriya literatury. Osnovnye problemy v istoricheskom osvechenii" (The Theory of Literature. Basic Problems in their Historical Light (Vol. 1)), "Mezhdunarodnye svyazi russkoi literatury" (International Relations of Russian Literature), "Realizm i ego sootnoshenie s drugimi tvoricheskimi metodami" (Realism and its Relation to Other Creative Methods), "Problemy razvitiya russkoi sovetskoi dramaturgii" (Problems of the Development of Russian Soviet Dramaturgy (Vol. 1)), and "Vzaimodeistvie i vzaimosvyazi natsional'nykh literatur" (Interaction and Interrelation of National Literatures).

In the field of linguistics, investigations were continued on theoretical questions of general and comparative-historical linguistics, a series of publications has been prepared on the history of languages of different structur and various systems; work has begun on such new branches of Soviet linguistics as applied and structural linguistics. Among 30 introductory collective works and monographs that appeared in 1960, were "Ocherki po sintaksisu russkoi razgovornoi rechi" (Sketches on the Syntax of Russian Conversational Speech), "Vengerskii yazyk" (The Hungarian Language), etc.

The further development of the institutes of the Siberian Division

and of branches of the Academy continues. Their scientific output is becoming more and more significant. Thus, in the Siberian Division, differential equations were constructed of extremal functions of cubic formulae and certain of the most important cases of their solutions have been investigated, the theory of a new class of boundary problems for equations of a mixed* type has been worked out, new results have been obtained in the theory of generalizing analytical functions.

The newly established computer centre of the Division has completed interesting work on deciphering the Maya script.

Siberian scientists have carried out an investigation necessary for the construction of chambers for the continuous detonative combustion of fuels. Continuous detonation is a new phenomenon observed for the first time.

The theoretical problem has been solved of the directed ejection of a mass of a continuous medium near in properties to an incompressible fluid. Experiments carried out have shown the suitability of the model set up for the solving of the problems of the directed ejection of ground in an explosion.

The optimal scheme of steam gas equipment has been chosen taking into account the requirements of industrial manufacture of its individual parts. The prospects have been determined of gas bearing fields in Eastern Siberia, and recommendations have been made for their exploitation.

An index of the development of the activity of the branches is the organization of many new institutes. Thus, in the Bashkir branch there is being established an Institute of Organic Chemistry, in the

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*smeshchanyi - Ed.

Kola branch two new institutes : Polar Geophysics and Mining Metallurgy, in the Karelian branch - a Geological Institute, in the Daghestan branch - an Institute of Language, Literature and National Creative Work.

Special attention has been given by the Presidium of the Academy of Sciences of the USSR to the strengthening of the Moldavian branch, where, in 14 scientific faculties, about 1000 scientists are working.

As is known, this branch is being changed into an Academy of Sciences of the Moldavian SSR. Thus, in 1961, all the Union republics will have their own academy of sciences.

In a number of fields, scientists of the branches have obtained considerable results of theoretical and practical value. Among them must be mentioned a new preparation against fungal skin diseases, synthesized and tested in the Kazan branch; in the same branch the possibility has been established of utilizing electron paramagnetic resonance for an approximate method of determining the content of quadrivalent vanadium in Tartar petroleums; the working out of the bases of the application of programming methods for the rational exploitation of the petroleum wells of Vtoryi Baku, etc.

The geologists of the Bashkir branch have compiled a general monograph "Geologicheskie zakonomernosti neftyannykh mestorozhdenii Bashkirii" (Geological Laws of Distribution of the Oil Beds of Bashkir), charts have been worked out of the oil and gas bearing characteristics of individual geological systems, and improvements have been suggested in the technique of prospecting for oil and gas. The chemists of this branch have elucidated the conditions for the purification of mixtures of high sulphur petroleums, allowing the reduction of the sulphur content to 0.5%. The biologists have

established that nucleic acids take part not only in the synthesis of protein, but also in the formation of substances of non-protein nature.

In the Karelian branch a series of works has been completed on the study of rational utilization and re-establishment of forest.

Among the geological investigations carried out in the Kola branch is the possible widening of the regions of prospecting for apatite, iron ore and other resources of the Kola peninsula. New methods have been suggested for processing complex sulphide ores and concentrates. The existence of new sulphates has been discovered. Investigations have been completed for a variant of the conflux of rivers Strel'na, Chavan'ga and the upper reaches of the Varzug and the river Ponoi, which will enable the production of electric energy to be increased.

Investigators in the Daghestan branch have shown the reversibility of radiogenic argon and helium in beryls. The nature of the capillary structure of the beryl has been explained, and the possibility has been established of a new mechanism of migration of radiogenic inclusions in minerals. Investigations on geothermics enable the heat balance to be proven at attainable depths of the earth's crust.

A general analysis of theoretical and experimental investigations in the field of the geophysics of ores has been completed. The work of the branch, "Yadernaya geofizika pri razvedke rudnykh i ugol'nykh mestorozhdenii" (Nuclear Geophysics in Prospecting for Ore and Coal Deposits) was presented at an international conference in Denmark.

The bases of the laws of the exchange of metals in the living organism have been elucidated, and a new product for the treatment of poisoning has been approved.

Investigations have been completed on the Dargian and Lezgian dialects.

In the Komi branch the bases have been established of the laws of the geological development of the territory in the Silurian and Devonian of the Pechora Ural. The scientific bases have been worked out of the most effective power systems for the forest industry of the republic.

In the upper reaches of the Pechora, remains of paleolithic man have been discovered; this is the most northern relic of the paleolithic in the world.

The examples reported of the activity of the branches give an idea of the development of science on the periphery of our country. It must be said, however, that we do not give these branches the necessary attention, and we do not give them sufficient help.

The council for the study of productive forces has issued comprehensive scientific reports on the work of the Krasnoyarsk, the Transbaikal and the Amur expeditions during the last five years.

In the year under report the USSR continued the fight for the development of peaceful co-operation between the peoples. The head of the Soviet delegation to the 15th session of the General Assembly of UNO, N. S. Khrushchev made proposals of liquidation of colonialism and on the general and complete disarmament. The fight for peace, for freedom and the equality of all peoples of our planet is the fundamental activity of the world communist movement and is fixed in a historical document - the Proclamation of the Conference of Representatives of the Communist and Workers' Parties held in Moscow at the end of last year.

One of the concrete forms of the fight for peace and co-operation between the peoples is the co-operation in science by the Academy of Sciences of USSR; this co-operation has considerably widened during the year under report. New agreements on cultural

co-operation were concluded with India, Indonesia, Guinea and Ghana. Last year 2400 Soviet scientists visited foreign countries, including the recently independent countries of Asis and Africa, of these, 1053 visited countries of the socialist camp. The number of long-term missions increased.

Into the Soviet Union came about 3700 foreign scholars. Of these, 2600 came to take part in large international scientific congresses held in our country: the International Symposium on Macromolecular Chemistry, the International Congress on Automatic Control, the 25th International Congress on Eastern Studies, etc. The journeys abroad of our scientists and the visits of foreign scientists to the Soviet Union made it possible to establish personal contacts.

One could bring many examples of the useful meetings of scientists of different countries, of the development of joint investigations with scientists of the socialist camp. Apparently, there has developed the necessity of a definite division of work in scientific investigations, on a level with the continuous co-ordination of the activity of scientists of the countries of the socialist camp. The participation of our scientists in international organizations has been strengthened. A number of Soviet scientists was elected or re-elected in 1960 to the leading organs of various international unions.

Together with the exchange of experience in scientific investigations, each meeting of Soviet scientists with scientists of the capitalist countries reflects, to one or other extent, the struggle between the ideology of socialist society and the reactionary ideas of the "Western World". The arena of the sharp ideological fight was the 15th International Congress of Historians, which took place in August of

last year in Sweden. The achievements of the delegates of the Soviet Union at the congress allowed the popularization of the achievements of Marxist historical science and the elucidation of the basic propositions of historical materialism before wide audiences of historians of different countries.

A yet sharper struggle broke out at the time of the preparation and holding of the international congress of orientalists in Moscow.

The 6th Pugwash conference of scientists on disarmament and the ensuring of safety of the peoples, held in Moscow at the end of last year, was of great significance. A large group of Soviet scientists took part in the work of the conference, and a very numerous and authoritative American delegation and representatives of other countries also took part.

In the resolution adopted by this conference, the need for the establishing peace over the whole world by universal and total disarmament, was clearly emphasized.

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The results achieved by our science in the year under report are certainly great, and in the account given here, only a small number of them could be mentioned. However, all these results are not sufficient, compared with the demands of our national economy, and, indeed, it is exactly the correspondence to the practical demands that must serve as the basic criterion for evaluating the level and success of our activity.

In explaining the reasons for the non-correspondence of results

achieved to the tasks set, more often than not the insufficient volume and the insufficient material support of the works of scientific investigations are cited. However, the rapid growth and development of scientific advances, which are seen even in the example of the year under report, show that the heart of the matter is not in this.

Of more importance are the defects in the organization of scientific work and, in particular, in the carrying out of scientific investigations.

Although the scientific councils on problems have, in general, improved their work, nevertheless, many of them are still passive and do not fulfil even the elementary obligations of clear and timely exchange of information between investigators. The planned measures of co-ordination have not yet been put into practice. In consequence of this, we utilize badly one of our most important advantages - the possibility of planning and effectively distributing work in scientific investigations, as is the case in our whole national economy.

Let us take such a basic question as the relation between production and the utilization of the results of scientific investigations in industry and agriculture. We all understand the enormous importance of the rapid introduction of the results of scientific achievements in practice. However, the questions of this introduction are still being solved inadequately.

It would seem that the plan for introduction of the results must include our principal works, the practical application of which may be determining in one or other field. On this matter, it presents a list of achievements, which it is expedient to introduce in industry. In this list, there are undoubtedly useful and correct proposals, but all the same, more or less secondary, dealing with improvements of apparatus and particular improvements of existing production

processes.

I have already spoken of certain great national economic measure which have been prepared by our scientists. Actually, this is our basic contribution to practice, contributed in this year. But, indeed, almost all was done outside the "introduction" plan. That means, we must reorganize our relations with practice, in order to give the most favourable conditions for development and transfer to the national economy just those great measures, from the application of which the country will gain economics of tens and hundreds of millions of roubles and increase the efficiency of production.

We have not yet broken through to satisfactory results in the difficult matter of planning scientific work. The determination of chief directions and of the most important problems in science is a good step forward, but we must, at once, move further on the path of making more precise the goals standing before the investigators working on a problem, of more accurate framing of these problems, which now occupy frequently whole fields of a science, and even of several sciences.

We must establish some sort of objective, be it even the most general, means of evaluation and comparison of the results of scientific investigations.

I suggest that we are still not looking ahead far enough.

Although we have considerable accumulation of results not yet introduced in production, we must not forget that it is our science that must build and clear the road for technical progress. That is accepted. But for this, we must occupy ourselves in advance also with such questions as will become important in the national economy only after some time, say in 5, 10, 15 years.

We have brilliant examples of such achievements. For example a large number of physicists is already working on the investigations of the possibilities and methods of controlled thermo-nuclear reactions. Another example - the break-through into cosmic space is a great step in the progress of human knowledge, made in our country.

However, if we look at many other problems, the solving of which is undoubtedly important, then we see a different position. Thus, we are developing such enormous energy resources as the cheap fuel under our feet at an extraordinarily slow tempo.

Speaking of the prospective development of science, our chemists and biochemists speak of such things as synthetic food products, or the direct conversion of the energy of chemical reactions into mechanical motion. However, almost no one is yet interested practically in these questions.

It seems to me that, in order to solve these problems, and that would undoubtedly be expedient, there should be set up a small, even a very small, but chosen team, and then this work will advance.

The interrelation of science and production must be strengthened, not only in regard to the improvement of the transmission of scientific results to industry, but also to the feed-back of practical knowledge to science. Here we must continuously practice the exchange of personnel and the mutual transfer of ideas.

We often and justifiably complain of the inadequate selection of scientific personnel in our in institutions, of the difficulties and deficiencies hindering us in leading into science just those people (and there are many of them in our country) who have great creative powers and the burning, all-consuming wish to devote themselves to research work. We have not yet put into practice the good suggestions we have worked out, on probationership, on different forms of

exchange of personnel between scientific institutes and production. We must bring this matter to a conclusion.

At the same time, we must not forget also the new forms of relation between science and production. For example, at the moment, with regard to the rising level of the vocational training of youth, and the shortening of the working day, the conditions for the development of various forms of social-scientific and technical-scientific activity are considerably improved, and this will bring good results. I am not certain, whether the members of the Academy know that in our country there are already more than two thousand independent constructor bureaux, organized on social lines, that in the great undertakings and factories, there are even popular scientific research institutes, where a large number of leading workers is working, gifted people, who wish to bring something new into their work.

We must devote more attention to this growing national initiative. It is necessary, probably, to encourage the participation of our scientists in such laboratories and constructor bureaux. Beside that, it may be expedient to establish in our richer institutes also certain popular forms of scientific research work. I suggest that this may serve as a supplementary means of attracting the talents of the nation into science.

Certainly, the insufficiencies I have mentioned are not the only ones, we have also other insufficiencies and errors. We must suppose that the participants of the meeting will discuss them and will submit criticism of the work of the Academy. In particular, it would be desirable to hear views on questions of the organization of scientific work.

We have reached an extremely important stage of the development of Soviet science and, indeed, of world science. Yet wider expands the construction of the material-technical basis of communism, developing according to a strict plan and with gigantic scope. This gives a wonderful possibility for the realization of the most daring ideas of scientists and, at the same time, places on workers of Soviet science the enormous responsibility that the forces of our people be utilized in each sector of production and construction most economically, most effectively and most expediently.

We must become that true compass of practice of which, not long ago, N. S. Khrushchev spoke. It is a matter of honour for our scientists - to cope with this colossal problem.

I wish to express the certainty that, in preparation for the 22nd session of the Communist party, the scientists of our country will give new great suggestions for the improvement of production, will break through to new great successes in solving of the extremely important problems of modern science, and, in this way, will fulfil their duty to the Soviet people.

*PROBLEMS OF ORGANIZATION OF SCIENTIFIC WORK

+M. N. Keldysh

**Ekonomicheskaya gazeta, 13th June 1961, pp. 2-3

The Tasks of a Further Development of Science and of the Liquiditation of Deficiencies

In this present period of the comprehensive building of communism the party has set Soviet science and engineering the great task of taking the leading place in the world in all their decisive branches. In order to fulfil this major task successfully within a short period of time, we shall have to raise all scientific research work in the country to a still higher standard and improve the way in which this work is organized. This should in fact become the main purpose of the activities of the State Committee for the Co-ordination of Scientific Research which was recently set up under the Council of Ministers of the USSR and of all scientists throughout the country.

The decision of the Central Committee of the CPSU and the Council of Ministers of the USSR provides conditions for eliminating some substantial shortcomings in the organization of research. Up to now the mighty forces of our many research institutes and scientists have been distributed among 170 Union and republican Ministries and departments, and each of these has been concerned with its own sphere of

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* Extract from speech by M. V. Kel'dysh "Soviet Science and the Building of Communism". - Ed.

\+ President of the Academy of Sciences of the USSR (from 19th May 1961)

** NLL shelf mark: R019792. Holding: 4th July 1960-

activity. There has been no overall co-ordination in most of the research done. The plans for the introduction of the results of research have often been cut off from the plans for designing work, and no provision has been made for experimental bases that would ensure the construction of pilot plants.

There have been cases when the implementation of very important results of research has been delayed for long periods. The sub-assembly principle in instrument making, for instance, was developed by IAT (Institute of Automation and Remote Control) as far back as 1950. Its implementation would have enabled the state to save considerable resources. Nevertheless the instruments developed on the basis of this principle were put into production only in 1956-57, and even then only in very small quantities.

In spite of all the efforts of the scientists, there was a delay of more than 10 years in introducing the method of producing new types of synthetic fibre-forming polymers, the "enant" polymers whose qualities surpass those of caprone.

And there are cases when the implementation of the results of research are impeded due to an underestimation of their practical importance by the scientists themselves. Thus, as a result of research carried out by the Academy of Sciences of the USSR in 1954, a new principle was developed for using semiconductor devices as non-linear capacitors. Yet we started working on the improvement and use of these devices in fact only after the foreign press had reported their use in what are known as parametric amplifiers.

The greatest difficulties arise in cases when the implementation of the results of research calls for the efforts of several departments or for additional research in allied fields. Soviet chemists, for

instance, were the first to synthesize stereo-regular polyisoprene rubber, whose properties bring it very close to natural rubber. Nevertheless the required measures were not taken to overcome certain technological difficulties, and, as a result, we are now lagging behind the United States in organizing the production of this important material.

At a number of enterprises the introduction of automation is being retarded. This is due to the fact that not enough attention is being paid to automation when designing enterprises and machines and in elaborating the sequence of operations. Comprehensive automation calls for the wider co-ordination of the work of many establishments.

Sometimes the introduction of the results of research depends on the work of many organizations subordinated to various departments. For instance, in the chemical industry the elaboration of laboratory synthesis, the designing and construction of an experimental installation and determining its specifications and the designing and building of an industrial installation are often operations carried out consecutively by different bodies.

In a number of cases when institutes lack experimental equipment, scientific investigations are not completed. At times a number of institutes build similar testing installations which are not used to capacity. The testing equipment should be concentrated at large establishments which can cater for the needs of other research and design bodies.

However, there are several vital spheres of science and technology where every effort should be concentrated on finding new solutions and parallel research might be necessary. Nevertheless parallelism, as a rule, is not justified and sometimes assumes distorted forms. For example, about 100 bodies are engaged in work on the problem of the

direct conversion of heat energy into electric power. On a nation-wide scale the efforts of these bodies are not directed at any specific tasks, and their spheres of research are not defined within limits. This engenders unnecessary duplication of work on one and the same subsidiary problem with a resulting lag in the work on other no less important subsidiary problems. And it should be pointed out that in cases like this each body seeks to get from its department as much money and material as it possibly can to build its own experimental installations.

About 150 establishments are working on digital programming control systems for automatic machines and installations. The main attention is usually directed, not towards the elaboration of the sequence of operations of automatic control, but towards the creation of electronic computers which are often similar in design.

Duplication of effort in scientific research is often the result of the fact that an institute, department or economic council finds it more convenient to set up an establishment of its own rather than co-ordinate its activity with neighbouring bodies which can often do a better job. It is important to combat these tendencies because they lead to the diffusion of efforts and resources.

The delay in the introduction of scientific achievements in production is largely due to the absence of unified planning and co-ordination of the work of the institutes, designing bureaux and industries.

It would appear to be advisable to increase the share of allocations for scientific research and experimental design in proportion to the economic effect derived from the results of this work.

Measures should be taken to strengthen the experimental basis for scientific research and improve the pilot installations of the design

bureaux. Special attention should be paid to the rational territorial distribution of these establishments. This can be achieved through setting up design bureaux and laboratories at the plants.

It will apparently be necessary to work out measures to encourage enterprises introducing new machinery. This encouragement should be proportionate to the economic effect to be derived from the new machinery and its importance for the national economy as a whole.

There are a number of shortcomings in the work of the Academy of Sciences. This in large measure is due to the fact that some of the Academy's institutes are working on branch problems and also to the fact that branch institutes have been set up within the framework of the Academy. At the same time a number of spheres of paramount theoretical and practical importance have not received proper attention.

For instance, insufficient effort is being made in the field of cybernetics-the science of control processes, which is of overriding practical and theoretical importance today. Investigations in this field should be speeded up. They should be concentrated in a special institute or a special co-ordinating council.

Our economists have not been paying proper attention to working out the scientific foundations for the solution of such urgent problems of the national economy as the improvement of long-term planning methods, the effectiveness of capital investments and new techniques, price formation and material incentives in industry and agriculture. The achievements of mathematics and computer techniques are not being employed sufficiently in economic studies.

We are lagging behind in the solution of a number of important theoretical problems of biology due to the lack of concentrated effort.

Another essential shortcoming of some of our institutes is the

dispersal of effort on a large number of problems and inertia in switching over to new problems. There have been cases when investigations have been undertaken in the absence of the necessary scientific prerequisites that could ensure success. A case in point is the work on forecasting earthquakes.

The decision adopted on the 3rd April 1961, by the Central Committee of the CPSU and the Council of Ministers of the USSR* "On measures for Improving the Co-ordination of Scientific Research in the Country and the Work of the Academy of Sciences of the USSR" has paved the way to swift progress in scientific research, experimental work and designing in industry, in all the scientific investigations being carried out in our country. The measures provided for in this decision open up opportunities for the most rational grouping and employment of scientific forces and material resources on a nationwide scale in accomplishing the tasks confronting Soviet science in the period of the comprehensive building of communism.

The creation under the Council of Ministers of the USSR of a State Committee for the Co-ordination of Scientific Research will enable us to concentrate the efforts of the scientific establishments subordinated to different departments on the early fulfillment of research on major scientific problems of importance to the national economy and to ensure a further and even more stupendous advance by Soviet science in the near future. The tasks set the Academy of Sciences in this decision will, beyond doubt, have a beneficial effect on the work of the Academy and will enable it to intensify its research in the natural sciences and the humanities and give an impetus to the elaboration of theoretical problems.

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*See NLL Translations Bulletin, July 1961, pp. 569-577. - Ed.

Planning and Co-ordination

Planning and co-ordination are the factors which govern the organization of scientific research. One of the most important conditions for success is to determine correctly the leading problems on which efforts and resources should be concentrated in the first place. It would appear to be advisable to incorporate these problems in a unified state research plan, a plan which would consist of the following sections:

major problems of the national economy which are in the experimental design stage;

long-term scientific investigations aimed at the solution of problems of the national economy that have already been defined;

investigations aimed at revealing the laws of nature, which would open new ways of progress.

The first section should deal with such problems as automation, polymers, gas turbines, new metals and alloys, and so on. To solve these problems the joint efforts of many scientific, design and production bodies will be required. For instance, to solve the problem of automation it will be necessary to develop investigations in the sphere of mathematics, physics, chemistry and electronics. Metallurgy and the chemical, engineering and other industries will be required to elaborate the sequence of operations and methods of control corresponding to the current possibilities of automation.

The diversity of scientific problems and the exceedingly wide scope of application of polymers in all branches of industry and construction and in agriculture and medicine demand that, alongside experts in high molecular compounds, chemists in other fields, physicists, experts in mechanics, biologists, medical workers and others should

also take part in this work. Today no less than 300 scientific, experimental and industrial organizations are working in this field.

The plan for such problems should provide for the consecutive implementation of all stages of work, the unification of all research, experimental and design work, and the introduction of the results in the national economy. It is a great mistake for various industries to adopt, and even legalize, the practice of isolating research plans from the introduction of the results obtained. The plans should take into account the division of labour between different industries and organizations, the financing of material and technical supplies, construction, and so on. It goes without saying that they should provide not only for the work of research institutes but for design bureaux, industrial laboratories, experimental plants and industrial enterprises as well. Well-founded estimates of the economic effect to be expected from the introduction of the results of research in industry should constitute an integral part of the plans. In this a great deal has to be done by our economists.

The Academy of Sciences should take an active part in providing the theoretical research necessary for introducing new technologies in industry.

There are many good examples in which the requirements of everyday life lead to the merging of new trends in the work of the Academy of Sciences and other institutions. An example of such developments can be found in many branches of physics, in the new methods of approximate solution of complex mathematical problems, in radiation chemistry and radiation biology research, geochemistry, plasma physics in connection with the atomic industry, and mathematical logics, controlled processes and the theory of information in connection with automation problems.

It is necessary to develop new schools of mechanics connected with the specific structures of polymer materials and to introduce them on a wide scale in the polymer industry.

The second section of the plan, concerned with long-term scientific problems, such as thermonuclear fusion and the direct transformation of thermal energy into electricity, should provide for research, the creation of large experimental installations and preliminary design work. Factories and industrial design bureaux take no part in this stage of the work and no industrial installations are built. It is not always possible to determine accurately the economic effect of the work This research should be carried out by the USSR and republican Acadamies of Sciences, by the major branch institutes and higher educational institutions, together with the industry manufacturing the experimental installations.

In drawing up the first two sections of the plan it should also be taken into account that different industries present different demands to different branches of science (for example, the aircraft industry is not the only one which is interested in problems of aerodynamics). As a rule, these isolated requirements contain scientific problems in common,which can be solved not in different research institutes, as is often the case, but in a single institute. The committee's learned council can sum up the practical demands addressed to various spheres of science and concentrate the solution of the problems involved at the institute best suited for the purpose. Naturally, when different paths for achieving scientific results are indicated, parallel research can be conducted, having in mind creative competition between research teams for the speediest and best solution of the problems involved.

Finally, there should be a plan of fundamental research which should constitute the third section of the state plan. This section

should outline the broad spheres of investigation where important discoveries and new principles of applying the laws of nature to technological processes may be expected. The correct channeling of fundamental research is dictated by the logic of scientific development. The planning of fundamental research is extremely difficult and should be handled, therefore, by the most qualified scientists in the country. The preparation of proposals for the plan of fundamental research is one of the most important tasks of the Academy of Sciences of the USSR.

Understandably, it is impossible to forecast a specific discovery. Discoveries originate as a result of the comprehensive elaboration of promising fields. However, in every age there appear scientific trends which reveal in their development the underlying laws which may be expected to provide new principles for practical development. An example of such spheres today are the physics of high energy elementary particles, the chemistry of polymers and bio-polymers, nuclear physics, solid-state physics and cybernetics. The most important spheres of modern science are those which penetrate most deeply into the structure of matter, study various transition processes and deal with processes in human activity and in living organisms, in particular the functions of the brain. The advances in chemistry and physics due to the study of molecules, the atom, the nucleus and elementary particles are well known. The same goes for the study of reaction processes in chemistry. In biology equally decisive breakthroughs can be expected in the study of the molecular structure and functions of the living cell and its nucleus and the main physiological processes of the organism (photosynthesis, protein biosynthesis, and so on).

The application of new ways and means of research often has a profound effect on scientific development. The application of the

methods of one science to another is often especially fruitful. Thus did chemical physics, biological chemistry, biophysics, geochemistry, geophysics, biogeochemistry and other branches of science emerge. Many examples could be cited in which the creation of a new instrument has led to the development of new branches of science. Such was the case with the microscope, which served as the foundation for the development of microbiology, cytology and histology. Such was the case with the telescope and spectroscope, which led to the development of astronomy and astrophysics. Such is the case today with the electron microscope in molecular biology and with microwave radio spectroscopy, which have intruded on a wide scale into physics and chemistry.

Important new discoveries may be expected as a result of studying the phenomena of nature in extreme conditions: in conditions of exceedingly low or exceedingly high temperatures, extremely high potentials, super-high pressures, in the study of elementary forms of life in the purest state, viruses, for example, and so on. Work in extreme conditions affords the opportunity of discovering fundamentally new phenomena - superconductivity and superfluidity, the formation of elementary particles influenced by the energy of the atom measured in thousands of millions of electron volts, and so on.

It is common knowledge that practical demand greatly influences the development of science. For example, the demands of new technology have given rise to an extensive study of rare and diffused metals and their alloys. The demands of atomic and semiconductor technology have compelled analytical chemistry to rise to unprecedented heights. The demands of high-speed treatment of hard materials have enhanced the successfully completed work on the

synthesis of diamonds.

For the all-round development of the entire organism of the national economy, it is essential, of course, that the growth of heavy industry should ensure the development of all branches of the economy and the production of consumer goods.

In the new historical stage in the decisive phase of economic competition with the capitalist system, it is necessary that our technology should develop more rapidly than heavy industry, and the natural sciences, which form the fundamental basis of technical progress and constitute the chief source of the most profound technical ideas, should outstrip the tempos of development of technology. This circumstance must be taken into account when drafting the state plan of scientific research. As in industry, where parallel with a concentration of efforts on the decisive sections the Soviet state raises its general level, so in science it is necessary, parallel with a concentration of efforts on the leading problems where possibilities for practical use have already been revealed, to ensure a general front of scientific research.

In planning scientific research and its introduction in the national economy it is necessary to bear in mind that the new data received in the course of the work may call for substantial changes in the plans and even for drawing new organizations into the work. Accomplishment of the set aim in the shortest possible time largely depends upon the efficiency of current planning.

Adequate supplies of scientific equipment and instruments are an essential condition for the successful development of scientific research. Very frequently, up-to-date scientific equipment includes original, powerful structures, such as wind tunnels, accelerators of

fundamental particles, optical and radio telescopes, computing installations, testing machines and stands. Extremely delicate precision equipment is required in physics, chemistry, radio engineering, in modern biology, in various industries and in medicine. Metrology has to be put on a proper level. The production of a wide assortment of reagents and pure substances has to be organized. Scientific organizations devise a number of instruments in the process of research. But many of these general-purpose instruments do not reach the consumer. We believe that the State Committee for Co-ordination will undertake the co-ordination of work on new instruments, and will set up a scientific instrument-making industry. The new committee has to ensure effective forms of co-ordinating the most important interdepartmental problems. Co-ordinating work on a number of problems will be entrusted, as envisaged in the decision, to special state committees, Ministries and departments, and in particular cases, to main institutes under the general supervision of the Co-ordinating Committee. According to the decision of the Central Committee of the CPSU and the Council of Ministers of the USSR, the Academy of Sciences will be entrusted with co-ordinating work on a number of long-term scientific and technical problems and research problems. Academicians, particularly members of technical science departments, must take an extensive part in co-ordinating scientific and technical problems in the State Committee for Co-ordination, in specialized committees, Ministries, departments and main institutes.

One of the most important forms of co-ordinating science and technology must be the scientific councils on different problems of the Academy of Sciences of the USSR, of the State Committee for

Co-ordination and of other departments and main institutes. To a certain extent councils of this kind also existed in the past. Now this form of co-ordinating research and of solving a range of complicated problems of science and technology has to play an important role in uniting the efforts of science and technology and linking them together. A number of conditions have to be fulfilled in order that these scientific councils may justify their purpose. Besides scientists, they have to include also designers and leaders of corresponding industries. The members of the councils will have to work energetically on their problems. The councils have to be responsible for scientific designing and experimental work, and have to possess definite rights. It is necessary to devise forms for ensuring that these councils are provided with the scientific and technical staff for their work by the Committee for Co-ordination or any other organization under which such councils are formed.

No less important is the correct definition of the problems on the basis of which scientific councils are to be formed. These problems should not be too numerous but should be really leading ones for the corresponding branches of science and technology.

It is necessary to develop in every way the public forms of co-ordinating scientific research. An important role should be played in this by the press, scientific and scientific-technical societies, conferences and congresses which discuss the results of research on various problems and ways and means for their further elaboration. Thought should be given also to the question of encouraging the elaboration of more important problems by awarding science prizes, with competitions for the solution of such problems.

An important task of the State Committee is to improve the

network of research institutions. This is a question of reorganizing the institutes in accordance with the development of urgent new trends, and the setting up of new research establishments.

The tasks connected with bringing science closer to production are great—the organization of specialized scientific centres in outlying districts and the development of the network of factory laboratories and the enhancement of their role. The question of uniting some of the specialized design institutes with production organization should be considered. A large number of specialized problems which have come up at big institutes should be transferred to the respective factories by setting up laboratories at those factories and in every way expanding and strengthening the existing factory laboratories.

In the overall system of scientific research in the country, the most important problems are given to the Academy of Sciences of the USSR—research on important theoretical problems in the natural and humanistic sciences, the methodical guidance and co-ordination in these fields of the work carried out in the republican Academies and higher educational establishments.

By transferring to industry about half of the Academy of Science's research institutes working on problems of a specialized nature, conditions will be created for concentrating forces and resources on solving important problems facing the Academy. By transferring a number of institutes to the departments corresponding to their type of work, the tasks of these institutes will be linked more closely with those of industry with those of industry and agriculture and it will be possible to raise the level of research in the corresponding branches of the national economy.

The Academy of Sciences has a great deal of work ahead of it in carrying out the decision of the Central Committee of the CPSU and

the Council of Ministers of the USSR. In the first place, it is necessary to determine the most important fields of fundamental research and the most promising scientific and technical problems, and to concentrate on them the efforts of the institutes of the Academy of the USSR, the Academies of the Union republics and higher educational establishments. At the same time the Academy must take an active part in the work of the State Committee's councils on the main scientific and technical problems.

The Academy of Sciences must strengthen its ties with industry by taking part in solving major complex problems of the national economy. The practice started by the Academy of Sciences of organizing laboratories at industrial and agricultural enterprises to facilitate the introduction of the results of research conducted by the Academy's institutes should be continued.

The concentration of the Academy's efforts on major scientific problems demands that its institutes be further relieved of small specialized themes and research in scientific fields which have lost their urgency.

The co-ordination of research conducted by the Academy of Sciences of the USSR,and the Academies of the Union republics should be improved. The Academy faces new tasks owing to the fact that it also has to co-ordinate work in the natural sciences and the humanities with the higher educational establishments.

REPORTS ON VISITS

The following published reports on visits have been received in the National Lending Library for Science and Technology, Boston Spa, Yorkshire. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the National Lending Library.

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(Report of a visit to Russia made by a 7-man technical study group from July 10th to August 9th, 1959. Institutions visited include in Moscow: the "K. A. Timiryazev" Agricultural Academy, the All-Union Institute of Veterinary Entomology,

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N. L. L. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. Centre, N. L. L. has received currently the translations listed below.

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Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from the National Lending Library, should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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KEDROSKI, B. V. - "Cytology of Protein Synthesis in the Living Cell".

GELFAND-MINLOS-SHAPIRO - "Representations of the Rotation and Lorentz Groups", Moscow, 1958.

PIATETS'NI-SHAPIRO - "Automorphic Functions".

KANTOROVICH - "Economic Calculation and the Optimal Use of Resources", Moscow, 1960.

BATYGIN, V. V. & TOPTYGIN, I. N. - "Problem Book on Electrodynamics", Fizmatgiz, 1961.

SMIRNOV, N. M. - "Problems in Equations of Mathematical Physics", Fizmatgiz, 1961.

VULIKH, B. Z. - "Fundamentals of the Theory of Linear Semiordered Spaces", Fizmatgiz, 1961.

MARKUSHEVICH, Editor - "Studies in the Theory of Functions of Complex Variable", Fizmatgiz, 1961.

PETROV, A. Z. - "Einstein Spaces", Fizmatgiz, 1961.

LADYZHENSKAYA, O. A. - "Mathematical Aspects of Viscous Incompressible Liquids", Fizmatgiz, 1961.

FOMIN, S. V., Editor - "International Mathematical Congress in Amsterdam (in 1958)", Fizmatgiz, 1961.

BONCH-BRUEVICH, V. L. & TYEBLIKOV, S. V. - "Method of Green's Functions in Statistical Mechanics", Fizmatgiz, 1961.

FOK, V. A. - "Theory of Space, Time and Gravitation", (2nd enlarged edition), Fizmatgiz, 1961.

RUKHADZE, A. A. & SILIN, V. P. - "Electromagnetic Properties of Plasmas and Plasmalike Media", Gosatomizdat, 1961.

- "Physics of Hot Plasma and Thermonuclear Reactions", Atomizdat, 1959.

- "Controlled Thermonuclear Reactions", Atomizdat, 1960.

CHERNETSKIY, A. V. & LOMIZE, L. G., Editors - "Some Aspects of Techniques Used in Physical Experiments For the Study of Gas Discharges", Atomizdat, 1961.

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DOKLADY AKADEMII NAUK SSSR
(Reports of the Academy of Sciences of the USSR)

YAKUBOVICH, A. YA. & GINSBURG, V. A.
RTS 1950. Synthesis of aliphatic compounds of elements by a diazo method. Synthesis of compounds of group III elements: organo-thallium and boron compounds.
1950 73(5) 957-958 5s.

KHIMICHESKAYA PROMYSHLENNOST'
(Chemical Industry)

BORESKOV, G. K. & SLIN'KO, M. G.
RTS 1883. The calculation of catalytic processes in industrial reactors.
1960 (3) 193-201 22s. 6d.

PRIKLADNA MEKHANIKA (Applied Mechanics)

SAVIN, G. M. et al.
RTS 1894. About the possibility of creating temperature stresses in the deformed body by the mechanical method.
1960 6(4) 445-448 10s.

SOVETSKAYA GEOLOGIYA (Soviet Geology)

ARKANGEL'SKAYA, V. V. & KATS, A. G.
RTS 1891. Mesozoic magmatic rocks of the eastern edge of the aldan shield.
1959 (4) 67-82 40s.

SOVETSKAYA MEDITSINA (Soviet Medicine)

ROZENTUL, E. B.
RTS 1941. The alkaline phosphatase content of the blood in women during pregnancy, labour and the puerperium during the polar winter.
1960 (7) 119-123 10s.

SVAROCHNOE PROIZVODSTVO (Welding Industry)

KABANOV, N. S.
RTS 1916. Gas-shielded flash butt welding of heavy-gauge tubes.
1957 (10) 1-7 17s. 6d.

TEPLOENERGETIKA (Heat and Power Engineering)

VUKALOVICH, M. P. et al.
RTS 1939. The equation of state for water, based on experimental data.
1961 (4) 76-81 15s.

TRUDY INSTITUTA FIZIOLOGII IMENI I. P. PAVLOVA (Transactions of the Institute of Physiology of I. P. Pavlov)

The following is a complete list of translations of papers from Volume 4 (1955) of the above journal. The majority of these translations have been announced in previous issues of the NLL Translations Bulletin.

TSAKHAEV, G. A.
RTS 1242. Problem of reflex regulation of milk ejection.
5-16 30s.

PAVLOV, G. N.
RTS 1243. Study of the reflex of milk ejection in goats with the aid of localized cooling of the spinal cord.
17-21 12s. 6d.

GOFMAN, M. A.
RTS 1244. Reflex regulation of milk ejection.
22-33 30s.

ZAKS, M. G.
RTS 1245. Reflex regulation of the tonus of the walls of the udder cistern and of the intra-mammary pressure.
34-50 42s. 6d.

TVERSKOI, G. B.
RTS 1246. Sensitivity of the muscles of ducts, cistern and the teat sphincter of a cow's udder to nervous stimuli and pituitrin.
51-57 15s.

LEVITSKAYA, E. S.
RTS 1247. Study of the working of the ejection mechanism in living mammary gland of a white mouse.
58-62 10s.

ZOTIKOVA, I. N.
RTS 1248. Effect of the nervous system on secretion and ejection of milk in the white mouse.
63-67 12s. 6d.

TVERSKOI, G. B.
RTS 1249. Role of pressure fluctuations in the cavity system of the udder in the stimulation of milk secretion.
68-74 15s.

TVERSKOI, G. B. & DYUSEMBII, Kh.
RTS 1250. Rate of milk secretion.
75-80 15s.

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RTS 1251. Distribution of fat and casein in consecutive portions of milk during a single milking of cows.
81-92 30s.

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RTS 1252. Characteristic of the production of butterfat in cows giving milk of different butterfat content.
93-102 25s.

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103-108 15s.

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109-122 25s.

KOKORINA, E.P.
RTS 1255. Study of the effect of the hormone of the thyroid gland on the physical and chemical properties of butterfat. Part 2. Effect of air temperature and physical stress on the physical and chemical properties of butterfat.
123-131 22s. 6d.

PAVLOV, G.N.
RTS 1256. On the method of studying the nervous regulation of lactation.
132-135 7s. 6d.

ELISEEV, A.P. & PAVLOV, G.N.
RTS 1257. Anatomical and histological study of the innervation of the udder in the goat and cow.
136-144 22s. 6d.

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213-216 10s.

SKVORTSOVA, A.A.
RTS 1259. Effect of lactation on blood circulation, respiratory metabolism and respiration in cows.
217-229 32s. 6d.

TRUDY INSTITUTA METALLURGII: AKADEMIYA NAUK SSSR, URAL'SKII FILIAL (Transactions of the Institute of Metallurgy: Academy of Sciences of the USSR, Ural Branch)

DIEV, N.P. et al.
RTS 1876. Reaction of iron sulphides with sulphur dioxide.
1958 (2) 95-105 27s. 6d.

CHERMAK, L.L. & DIEV, N.P.
RTS 1855. Improvements in extraction methods for cobalt from converter and waste slags in the nickel industry.
1958 (2) 169-180 30s.

UGOL'UKRAINY (Coal of the Ukraine)

SHISHKIN, N.F. & MINDELI, G.V.
RTS 1909. Fast-acting protection against leakage currents and the compensation of capacitive currents in low-voltage networks.
1960 (10) 35-39 10s.

ZHURNAL VSESOYUZNOGO KHIMICHESKOGO OBSHCHESTVA im. D.I. MENDELEEVA (Journal of the D.I. Mendeleev All-Union Chemical Society)

KONONOV, V.A. & EVENCHIK, S.D.
RTS 1903. Modernization of the plant and intensification of production of concentrated phosphorous fertilizer.
1961 6(1) 2-16 35s.

PATENT

GREBNEV, A.N. & KAKOVSKII, I.A.
RTS 1856. Method of flotation of the oxidized and sulphide ores of non-ferrous metals.
USSR Patent No. 125207, 1960, 2 pp.

SOVIET STANDARD

RTS 1923. Leather. Specifications.
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NEW RESEARCH ACTIVITIES AT THE MIKhMa - THE MOSCOW INSTITUTE OF CHEMICAL MACHINE CONSTRUCTION

D. T. Kokorev

*Khimicheskoe mashinostroenie, 1961 (3) 1-2

The perfection of all aspects of industrial processes on the basis of the latest achievements in science and technology is the main objective of our nation during the extensive building of a communist society.

The solution of this task will create the prerequisites for a further growth of the productivity of labour and thus, in turn, lead to increased production capacity in all branches of the national economy.

From this standpoint, progress in the chemical industry depends to a large extent on the application of science and technology to chemical machine construction and on automation of processes in the chemical industry.

In recent years, and especially after the May (1958) plenum of the Central Committee of the CPSU, the science and technology of chemical machine and instrument construction has undergone considerable development. A considerable contribution was made by workers of MIKhMa, who concentrated their efforts on solving scientific and technological problems in all major directions of the rapidly expanding chemical industry.

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In this Institute, the theory of continuous processes and apparatus has been developed and is being perfected. It was possible to design a method and equipment for the continuous production of phenolformaldehyde resins, now operating on a pilot scale in the Nizhnii-Tagilsk plastics factory; the same investigations form the basis of a project for setting up multi-ton works in several factories.

Jointly with the Academy of Sciences of the USSR and the Moskovskii neftekhimicheskii zavod (Moscow Petrochemical Factory), we have devised a new technology and apparatus for the direct synthesis of acetic acid from butane.

Studies dealing with the intensification of mass-exchange processes have stimulated the production of rapid rectifiers. From theoretical and experimental investigations of pseudo-boiling systems we were able to establish the mechanisms of the various phenomena in question. This resulted in the creation of advanced apparatus, in particular equipment for drying suspensions in the boiling layer of an inert granular material; this equipment is now being tested on a pilot scale.

In this Institute, a new thermodynamic cycle has been worked out and on its basis equipment for an ultra large-scale production of liquid oxygen has been designed; a prototype is now undergoing industrial testing.

Analytical and experimental investigations have resulted in the construction of different types of industrial mixers for disperse materials which speed up mixing processes several fold and yield high quality products. Such mixers have already found wide application in many industries, e.g. dyestuffs, plastics, electrocarbon, foodstuffs, etc.

The development of completely automatic processes in chemical

industry has acquired special importance. In this field, the Institute is engaged in broad theoretical and experimental research and particularly the statistical method for the determination of dynamic characteristics and optimum working conditions is being improved. A method for the automatic control of high pressure polymerization of ethylene has been worked out. Integrated automation of the drying-adsorption section in sulphuric acid production, devised in this Institute, has been introduced in the Voskresenskii chemical combine.

Research into the corrosion resistance of apparatus used in chemical industry has had considerable publicity and practical utilization. On the basis of analytical and experimental investigations corrosion resistance characteristics for numerous metallic and non-metallic construction materials have been obtained and new materials have been introduced, e.g. "Grafoplast", which has replaced lead and some alloyed steels. This material possesses high corrosion resistance and mechanical properties, is cheap, can be readily machined, and is easy to cast. In the factory "Akrikhin", parts of rotary pumps and of other "grafoplast" apparatus are being made from "Grafoplast".

The production of optically sensitive polymers, which have proved most useful in various branches of technology when dealing with strength problems on model specimens, is being investigated at the Institute.

A new method for eliminating static electricity, based on the ionizing action of radioactive isotopes, has been developed. It has already found wide application in many branches of industry.

The 22nd Scientific and Technical Conference of professors and lecturers of the MIKhMa, at which the results and the solution of many

scientific problems were surveyed in 78 lectures, was attended by over one thousand scientific and industrial workers, drawn from 50 organizations from Moscow, the greater Moscow area, Leningrad, Sverdlovsk, Riga, Groznyi, Tula, etc. Such a wide representation was due to the close contact of the Institute with industrial combines of 13 sovnarkhoz* and with many research associations in the country. The discussions, in which over 200 delegates took part, helped the Institute to evaluate its scientific activities objectively, to check the correctness of scientific directions, and to mark new ways for the solution of important problems concerning the construction of chemical apparatus and machines.

The Institute, in wholehearted support of the 22nd Congress of the CPSU, pledged to accomplish on time a number of scientific researches and to introduce completed investigations into industry.

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*Council of National Economy - Ed.

THE CZECHOSLOVAK ACADEMY OF SCIENCES

A useful handbook* briefly describing the activities of the institutes, laboratories and committees of the Czechoslovak Academy of Sciences has recently been added to the NLL reference collection.

This handbook includes the text of the 1952 Law on the Czechoslovak Academy of Sciences (as amended in 1957), the 1958 Statutes of the Academy, brief biographical notes on its members, notes on its institutes and affiliated scientific societies, as well as a chapter on the serial publications of the Academy. Addresses (and telephone numbers) of the institutions and of the Academicians are given.

H. S.

THE CZECHOSLOVAK ACADEMY OF AGRICULTURAL SCIENCES

A handbook+ reviewing the activities of the Academy in the period 1953-1959 has recently been added to the NLL reference collection.

The Czechoslovak Academy of Agricultural Sciences (ČSAZV) comprises 28 research institutes, 10 research stations, 8 laboratories and 5 units staffed by 240 scientific and 2143 engineering-technical workers. Its Central Agricultural and Forestry Library is not only

*"The Czechoslovak Academy of Sciences", ČSAV, Prague, 1959. 273 pp. Unpriced.

+"Československá akademie zemědělských věd: 1953-1959", SZN, Prague 1960. 232 pp. 34 Kčs.

the library of the Academy but is also a national agricultural library. Its collection doubled in size from 200 000 volumes in 1948 to 430 000 volumes in 1959. The library maintains exchanges with 930 institutions outside Czechoslovakia, and its documentation (i.e. abstracts) section processes some 1600 issues of foreign periodicals, 120 foreign books, and 170 foreign patents monthly; translations are made from 22 languages.

The handbook also includes the text of the 1952 Law of the Czechoslovak Academy of Agricultural Sciences, the 1959 Statues of the Academy, short biographical notes on its members, notes on its institutions, sections, committees, etc. Again, addresses (and telephone numbers) of the institutions and Academicians are given. A short chapter notes the publications of the Academy.

The handbook is illustrated; text is in Czech and Slovak, with contents list in English.

H. S.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the National Lending Library for Science and Technology, Boston Spa, Yorkshire. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the National Lending Library.

EDUCATION

SOUTER, L. S. and WINSLADE, R.: "Women Engineers in the USSR". Caroline Haslett Memorial Trust, 25, Fouberts Place, London W.1.

(A report of a 16 day tour of the USSR made in June, 1960, to study the education, employment, and prospects of women engineers in the USSR. Institutions visited include, in Leningrad: The Leningrad Polytechnical Institute; in Moscow: The Committee of Soviet Women, The Ministry of Higher Scientific and Technical Education, the State Committee for Science and Technology of the Council of Ministers of the USSR, the Maxim Gorki Secondary School, Technicum No. 14, The Institute of Ways of Communications (transport), the Moscow Institute of Power Engineering, the Research Institute of Common Technologies, Krasnyi Oktyabr Sweets Factory, Likhachev Motor Works; in Kharkov: Kindergarten No. 36,

School No. 126, Kharkov Polytechnical Institute, the Kharkov Institute of Building Construction, and the Kharkov Tractor Factory.)

NLL shelf mark: V 124

ENAMELS INDUSTRY:

NICHOLLS, J. et al.: "The Institute of Vitreous Enamellers Anglo-Russian Exchange Visit 1960", The Institute of Vitreous Enamellers Bulletin, 1961 11 (10) 105-115.

(Report on a visit by 8-man team from 20th August to 30th August, 1960. Institutions visited include in Leningrad: the Technological Institute, the Chemical Food Industry Combine, the Gas Apparatus Factory No. 4: in Novocherkassk: Polytechnical Institute; in Lugansk: Artyom Factory; and in Moscow: The Agricultural and Technical Exhibition. The team also met the Chairman of The State Scientific Technical Committee of the RSFSR.)

NLL shelf mark: V 123

CEMENT INDUSTRY

LAFUMA, H. et al.: "Compte Rendu de Mission en URSS de Representants de l'Industrie Cimentiere". Unpublished report.

(Report of a 5-man team which visited the USSR from 9th to 28th April, 1960, to study the cement industry. Institutions visited include, in Leningrad: The Institute of Technology, The Institute of the Chemistry of Silicates, and the Vedeneev Institute for Research into Hydro-techniques, the Giprotsement Institute and the Voroskoi cement works; in Moscow: the Reinforced Concrete Research Institute, a prefabricated reinforced concrete components factory, and

the Academy of Construction and Architecture; in Podolsk: the Cement Research Institute, an experimental factory of Gosstroi; in Volski: the hydro-electric plant on the Volga; in Mikhailovka: the "Sebryakov" cement works; in Stalingrad: a prefabricated reinforced concrete components factory, the Keramizit plant; in Novorossiisk: a cement combine, the "October" cement works, the "1st May" cement works. An overall survey is presented, rather than details of specific plants and institutions visited.)

NLL shelf mark: V 113

N. L. L. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. centre, N. L. L. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to National Lending Library for Science and Technology, Boston Spa, Yorkshire, and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from the National Lending Library, should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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GUMENSKI, G.M. et al.:	"Vibroburenie gruntov" (Soil drilling by vibration)	RSFSR Ministry of Municipal Economy 1959	4th
GUREVICH, A.G.:	"Ferrity na sverkhvysokikh chastotakh" (Ferromagnetic semiconductors at ultrahigh frequencies)	Phys-Math 1960	4th
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PEVSNER, M.S.:	"Dety-oligofreny" (Oligophrenia in children)	Acad. Ped. Sci.	4th
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VAGRAMYAN, A. and PETROVA, Yu.:	"Fiziko-mekhanichkie svoista elektrolitichеskikh osadkov" (Physical and mechanical properties of electrolytic coatings)	Acad. Sci. 1960	1st 1962
	"Seismicheskii effekt podzemnykh vzryvov" Transactions of O. Y. Schmidt Institute of Geophysics, Issue No. 15 (The seismic effect of underground explosions)	Acad. Sci. 1960	4th

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MEASURES FOR THE DEVELOPMENT OF THE CEMENT INDUSTRY

*Byulleten' stroitel'noi tekhniki, 1961 (5) 3-5

The Central Committee of the CPSU and the Council of Ministers of the USSR have stated in "O meropriyatiyakh po uskoreniyu razvitiya tsementnoi promyshlennosti v 1961-1965 gg." (Measures for the Speeding Up of the Development of the Cement Industry during 1961-1965) that the production of cement had been increased considerably during the last few years and that the quality of the cement had been improved.

The above statement observes that the development of this branch of industry does still not satisfy the increasing requirements of the building materials industry in spite of successes achieved in the cement industry, particularly during 1961 when the output will be $1\frac{1}{2}$ times greater than in 1958.

The Councils of Ministers of the Union Republics and the Councils of National Economy do not pay sufficient attention to problems connected with the development of the cement industry.

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*NLL shelf mark: R0024. Holding: 1953 (1)-(17), 1957 (8)-

The Central Committee of the CPSU and the Council of Ministers of the USSR have adopted several resolutions to speed up the development in the cement industry, to raise the standard of technology and to improve the quality of output as well as working and economic conditions of labour.

Proposals of the Central Committee of the CPSU and of the Councils of Ministers of the Union of Republics, of regional and district committees of the Party and of the Councils of National Economy on reducing construction periods of a number of cement factories were approved and also those which dealt with the introduction of additional production capacities during 1961-1965.

The capacity of new cement factories brought into use in 1961-1965 is to reach 49 391 000 tons/annum.

In 1965 production of cement will amount to 84 600 000 tons/annum; official figures given in the Seven-Year Plan for the development of national economy envisaged an annual production of cement of 75-81 million tons.

Figures for capital investment during the period 1961-1965, given in the statement, intended for the development of the cement industry, amount to 1346.2 million roubles.*

The Stavropol' plant for equipment for cement factories, the Krasnoyarsk factory "Sibtyazhmash" and the Bryansk plant "Strommashina" were instructed to manufacture integrated technological production lines for cement factories.

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* £1 = 2.52 roubles - Ed.

It is proposed that out-of-date plants should be replaced in the Russian Federation, in the Ukraine, in the Tadjik SSR, in Turkmen SSR and the Estonian SSR. In the Bryansk cement factory, in particular, rotary kilns will be replaced by more efficient kilns (size: 2.7 x 47m and 3 x 61m) which will have an annual output of 320 000 and 200 000 tons, and in the cement factory "Puteprovod" of the Stalinsk Council of National Economy two cement grinders with an annual capacity of 88 000 tons, etc.

The date of termination of work and of dismantling the out-of-date machinery in the cement factories is to be fixed by the Councils of Ministers of the Union of Republics, in agreement with the Gosplan SSSR.*

The Central Committee of the KPSS and the Council of Ministers of the USSR have instructed the Gosstroi+ to prepare standard designs of cement factories and to secure their delivery and use as from 1962 onwards.

The following points will have to be taken into consideration when preparing standard designs of cement factories:

The use of new, high-output equipment, the introduction of integrated mechanization and automation of production processes (which will secure higher output per worker: 2.5-3 times as compared to the 1959 output);

the introduction of industrial methods of building which combine building and assembly work and use of large blocks;

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*State Planning Committee of the Council of Ministers of the USSR - Ed.

+State Committee on Construction of the Council of Ministers of the USSR - Ed.

the setting up of rotary kilns, electrofilters and other equipment and the erection of slurry pits, preferably outside the plant, in open yards;

considerable reduction of additives to Portland cement and other types of cement so as to improve the properties of the cement.

The Councils of Ministers of the Union of Republics and the planning organization for cement factories pledge themselves to complete the initial work in such a way as to prevent piece-meal erection according to temporary schemes which may result in unfinished work.

The Gosstroi SSSR is directed to approve, in agreement with the Councils of Ministers of the Union Republics and the Gosplan, the extension of building schedules for the erection of new and the expansion of existing cement factories, in order to shorten the time of erection and to increase the output of the factories.

The Councils of Ministers of the Union Republics and the Ministry of Geology and Conservation of Mineral Resources are entrusted to carry out widest geological surveys during 1961-1963, for cement raw materials, geological surveys and explorations for new deposits of cement raw material, especially in the Eastern regions of the country, so as to establish new bases of raw materials for existing cement factories which work with imported raw materials or with processed raw materials.

The Central Committee of the CPSU and the Council of Ministers of the USSR have advised the Councils of Ministers of the Union Republics to secure the manufacture of 55 000 000 tons

of Portland cement in 1965, as compared to an output of 14 900 000 tons in 1958 and to reduce the output of clinker Portland cement to 20% (instead of 36.5%) in the total output and that of puzzolane cement to 8% (instead of 16.7%) the figures in brackets representing the 1958 figures.

The average mark of the 1965 cement should be 475 and that of Portland cement 500.

The Gosplan SSSR should, as from 1965 onwards, specify in the projects of plans for the national economy the following tasks for the various Republics:

The building of new cement factories with an output of Portland cement of quality not lower than Mark 500 and also of rapid hardening cement for factories producing reinforced concrete;

to carry out during the reconstruction and expansion of cement factories improvements in the quality of cement by reducing the amount of additives and to improve the technology of production processes for cement, to increase the degree of grinding and to introduce automatic dosing of components.

The ASiA* is instructed to carry out development work on the production technology of coloured cements during 1961, using ordinary raw materials; the Gosstroi SSSR should complete the revision and approve the standards for cement analysis and for the conditions of cement production and to approve by 1961 the working designs for the manufacture of machinery and equipment.

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*Academy of Building and Architecture of the USSR

During the planning of cement factories (belonging to the building industry and factories producing alumina) it was stressed that in connection with the output of rapid hardening cement the production of cement by the autoclave method (the cement being based on nephelite slurry) should be carried out. Thus, in 1961-1962, plans will be developed for increasing the production of binders, not containing cement, for mortars and for the manufacture of products by the autoclave method.

In order to provide the cement industry with new types of equipment the Central Committee of the CPSU and the Council of Ministers of the USSR have directed the Council of Ministers of the RSFSR, of the Ukraine, White Russia, Georgia, Turkmenia, Lithuania and Armenia as well as of the State Committee of the Council of Ministers of the USSR for Automation and Mechanical Engineering, Gosstroi SSSR, the State Committee of the Council of Ministers of the USSR for Chemistry, the Academy of Sciences of the USSR, of the GlavNII of the Gosekonomsovet SSSR* to secure the completion of the work with regard to construction, the testing of equipment and also the manufacture of machinery and equipment for the automation of cement factories.

The Gosstroi SSSR, together with the Gosplan SSSR, the State Committee of the Council of Ministers of the USSR for Automation and Mechanical Engineering and the All Russian Council of National Economy are to approve the range for equipment required for clinker burning plants and for cement grinding

*Chief Scientific Research Institute of the State Economic Council of the USSR - Ed.

including ancilliary equipment (electrical, control and measuring equipment, etc.).

In numerous factories reconditioning of basic production equipment in the cement factories will be carried out by specialized firms. It is, therefore, necessary to compile an inventory of spare equipment and other items for cement factories during 1961-1965.

To secure a well-timed building programme for cement factories the Gosstroi SSSR was instructed to confirm the planning schedules of the cement factories, specifying at the same time that the compilation of the design assignment (including the detailed specifications) should be completed not later than 4-5 months after the date of receiving the initial order.

The issue of the working drawings and complete specifications should not be later than 12-16 months after the approval of the project; basic information and alternatives should be given to the client in order to assess the output capacity.

According to the directives, the responsibility rests with the planning organizations, i.e. to carry out the work of technical documentation for the erection of the cement factories. The client is responsible for supplying in time qualitative specifications for the equipment which is to be included in the plants.

The Gosstroi SSSR, the Gosekonomsovet SSSR and the Council of Ministers of the RSFSR were instructed to work out and approve in 1961 directives for improving the work of planning and research institutes for cement industry and of mechanical engineering industry.

The Institute for New Building Materials of the ASiA, NIItsement* and Giprotsement+ of the GlavNII of the Gosekonomsovet SSSR were instructed to work out theoretical methods and parameters for a basically new technology for the manufacture of cement by simultaneous burning and grinding of the raw material in a high-pressure gas-jet; they are also instructed to plan, build and test, in 1962, a pilot plant which is to use the above technology.

The directives also stress the problem of introducing the technological equipment for the cement industry.

The Central Committee of the CPSU and the Council of Ministers of the USSR draw the attention of the Central Committees of the Communist Parties and the Councils of Ministers of the Union Republics, of the Regional and District Committees of the Party, of the Councils of National Economy, of the workers in factories, scientific, research and planning organizations in the building industry and the industry for building materials to the paramount national importance of speeding up the development of the cement industry which is one of the most important branches of the heavy industry.

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*State All-Union Scientific Research Institute of the Cement Industry - Ed.

+State Institute for the Design and Planning of Establishments and for Scientific Research in the Cement Industry - Ed.

RESEARCH AND EXPERIMENTAL DESIGN WORK ON DRILLING

*Neftyanoe khozyaistvo, 1961 (5) 7-12

There has been great development in the technique and technology of drilling in the post-war years in the USSR. And the results achieved in research and experimental design work have made this possible.

Some of the big developments that have been applied extensively are turbodrilling, both vertical and directional, the provision for drillers of a number of powerful outfits, integrated mechanization of laborious operations, a system for erecting derricks and drilling equipment in large units, several types of bits, and chemical reagents for treating drilling fluids.

The design of many mechanisms and tools was based on research on the theory of the breaking of rocks, on solving problems of the hydraulics of flushing fluids, and on the laws governing the relationships of drilling parameters.

The drilling of holes down to 2000 m on a great scale in the Ural-Volga region and others naturally directed the attention of

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*NLL shelf mark: R0124. Holding: 1945 (1)-1948 (12) incomplete
1953 (1)-(12) incomplete
1954 (1)-

research and design organizations to problems arising in the drilling of these holes.

The main achievement has been the extensive use of turbodrilling under these conditions, with results which have been better than those with rotary drilling since about 1950.

The figures obtained for turbodrilling in the Ural-Volga regions are much higher than those for rotary drilling, even when compared with USA figures for similar geological conditions.

The planned pace of development for the oil industry in the Seven Year Plan compels research and design organizations to find operative solutions for the industry's current problems and to anticipate its future needs. But in spite of the constantly increasing growth in the volume of deep drilling, the conditions for anticipating the needs of the industry have not been created everywhere. There have been long delays in starting to attend to these problems.

In the next 10-15 years, more than two thirds of the amount invested in drilling will be for holes deeper than 2500 m. Even now there are tasks for drilling 7000-10 000 m holes, and problems connected with the study of the earth's crust to a depth of 15 km and more are being solved.

So the general direction of research on drilling ought to be towards the solution of problems of deep drilling. This of course does not mean that branch institutes, TatNII (Tatar Research Institute), UfNII (Ufa Research Institute) Kuibyshev NII NP (Kuibyahev Research Institute for the Petroleum Industry) and others will not be concerned with the drilling of holes down to 2000 m.

Turbine drilling down to 2000 m has been sufficiently well mastered in the USSR. But in regions where the formations call for high torques the performance figures for turbodrilling are unsatisfactory and are not so good as for rotary drilling, even in its obsolete form, when compared with the USA figures. With increasing depths, the increase in on-bottom drilling rate is the decisive factor in the performance figures. At great depths turbodrills with high rotational speeds and low torques produce 2-3 times less penetration per bit than the rotary method.

Hence in most cases with existing turbodrilling equipment the performance figures obtained are so low that they distinctly worsen the average technical and economic results for drilling in the USSR as a whole.

In order to carry out the principal tasks in the drilling field in the Seven Year Plan, which consists in raising drilling speeds and lowering the cost of well completions and standards for the consumption of materials (largely by the extensive use of drilling bits of reduced and small diameters), a large integrated programme of research and design work has to be accomplished.

A characteristic feature in recent research and design work on drilling has been the co-ordination of efforts on the solution of the following basic problems: drilling to depths of 7000-10 000 m; automation and mechanization of drilling processes; drilling with bits of small diameter; development of high-quality fluids for deep drilling; theory of rock breaking and rock-breaking tools; and the development of high-strength tubing.

The following organizations and many others in addition to VNIIBT (Research Institute for Drilling Technology) are taking part in the solution of these problems: AzNII (Azerbaidzhan Research Institute), GrozNII (Groznyi Research Institute) with its branch at Stavropol', KuibyshevNII NP, UfNII, TatNII, KF VNIINefti (Kazakh branch of All-Union Research Institute for Petroleum), Giproneftemash (State Institute for Design of Petroleum Machinery), and Azinmash (Azerbaidzhan Institute for Machinery).

Co-ordination of research and design work on drilling is done by VNIIBT and Giproneftemash as the leading organizations. This unites the efforts of researchers and designers and prevents duplication of work.

Research and design work is mainly directed towards producing high-torque down-hole prime movers for turbodrills and electric drills, and bits giving much higher penetration rates than ordinary rock bits.

In addition to the production of high-torque turbodrills by combining multi-stage turbodrills in 3-6 sections, high-torque turbodrills are being developed on new principles. The method is to create conditions to increase the hydrodynamic load on a turbine stage in the left-hand zone of the power curve.

By means of bench tests, turbine blade profiles have been selected to give increased torques at low speeds and much lower shaft speeds.

A special by-pass valve in the new design of turbodrill is to provide variation in the flow of fluid through the turbine in accordance with variation in the pressure drop from running light

to the limiting torque.

Characteristics taken for this turbodrill in the 8-inch size showed that its limiting torque is almost double that of three-section 3TS5A-8" turbodrill for the same throughput capacity and pressure.

It is proposed to hold trials, in mid 1961 under industrial conditions, of experimental turbodrills with a reducing pressure line and reducing valves.

VNIIBT is developing multi-section turbodrills on new principles of assembly which eliminate the complicated adjustment of clearances. It is intended to use floating plastic rotors in the multi-section turbodrills that are now being developed and tested, and this will reduce the assembly of turbodrills into a multi-section unit to the screwing together of the threads of the different sections.

The use of plastic turbines and a new design of rubber bearing in turbodrills is intended to reduce running costs and to compensate for the greater number of sections in turbodrills by making the turbines cost less and last longer. The plastic turbines and new rubber bearings have also been shown by practical experience to improve the efficiency of turbodrills.

Yet another line in the production of high-torque turbodrills is the work on turbodrills with reduction gearing. The TR-8 geared turbodrill designed by Lyubimov is in its final stages and two other designs are being developed and bench-tested.

These designs employ partial sealing of the gear housing. One design gets maximum strength for the reduction gear by using large pinions. The other uses a system of differentiated

power transmission through multi-stage planetary gearing, with elastic components to ensure uniform distribution of load to the stages. These geared turbodrills are due for field trials in 1961.

Work on electric drilling is going in the direction of producing machines of small dimensions, reducing rotational speed of the bit while maintaining the torque, and reducing rotational speed with a proportional increase of torque by introducing a spindle reducing gear. Deep drilling with electric drills under complicated conditions calls for a reliable system of supply cables and electric drills. The design of cable to go inside the drill pipes needs to keep hydraulic losses to a minimum. A promising line in this connection is the development of a single-core supply cable with a capacitor motor. This complex problem is being solved in conjunction with KhEMZ (Khar'kov Electrical Machinery Works) and other organizations. It is proposed to produce a cable which will allow the passage of suitable torpedoes and devices inside the drill pipes for freeing the pipes if they are stuck in the hole.

Industrial trials of frequency control of motor speed from the surface showed that when bit speed was gradually reduced from 680 to 375 rev/min the penetration rate was approximately doubled when the mechanical speed of drilling was reduced by only 30%. This increased the penetration per trip by 50% at a depth of 3787-3978 m.

High-torque electric drills have been prepared for field trials in the form of a two-section machine and one with an oil-filled reduction gear. And a very interesting event in deep drilling is the current development of an electric drill with

a rotating casing.

Multi-section and single-section high-torque turbodrills need mud pumps with increased working pressures. The transition to deep drilling calls for an increase in the mean working pressure of pumps up to 180-200 atm, against existing pressures of 100-120 atm.

The Kuibyshev NII NP and Azinmash have developed hoses, gate valves and quickly detachable joints for the connection of pumps rated at 200-300 atm working pressure, and these are now in production.

In the next 2-3 years pumps of type U8-6 and 12Gr, designed for prolonged working at 180-200 atm, will be available for deep drilling with appropriate connecting gear.

Turbodrillers with diamond bits were tested by VNIIBT in 1960 in conjunction with drilling undertakings in the Azerbaidzhan, Stanislav and Bashkir Councils of National Economy. The results show a 20 to 60 fold increase of penetration rate in deep (3000-5000 m) holes under comparable conditions as against cutter bits, and a saving to be measured in tens of thousands of roubles. The VNIIBT diamond drill laboratory is developing and producing a series of bits in order both to test the design and also to select the best method of production for diamond bits.

Interesting results have been obtained in Groznyi and Azerbaidzhan from the use of so called "bearingless" bits with hard alloy inserts.

The results of the group of researchers indicated above, after testing on the bench and in the field, provide encouraging

data on the possibility of a distinct improvement in performance figures for deep drilling with down-hole prime movers in the next 2-3 years.

In view of the growth of deep drilling in Azerbaidzhan and Kazakhstan, in the Kuibyshev, Krasnodar and Chechen-Ingush Councils of National Economy and in the Ukraine, it is already, in 1961, expedient to equip drilling undertakings with high grade drill pipes of increased weight and the VNIIBT design of jet bit. This will enable rotary drilling to be carried out with conditions and make up of the bottom end of the drill string similar to those used in the USA, until the high-torque turbodrills and high pressure pumps come into extensive use. It will thus be possible to get a 1.5-2 fold increase over current turbodrilling in rate per trip and commercial rates in deep drilling, and some decrease in drilling cost.

It is possible to fulfil this task in 1961-1962 for the whole of the drilling in the deep ranges.

A rotary drilling laboratory is being organized in VNIIBT, since there are a number of cases in which this method can be employed profitably, but insufficient attention has been paid to the problems involved in perfecting it.

Jet bits and long (200-300 m) strings of heavy-weight drill tube will also be able to be used in the future in turbodrilling, when drilling undertakings are sufficiently well provided with TS-6" turbodrills of the new design. These were sufficiently tested in 1960 and permit an increase of 40-60 atm in the pressure drop in the drilling fluid in the big jets and in the orifice of the heavy-weight drill pipes.

A review of the position in deep drilling abroad and in the USSR was completed by VNIIBT and Azinmash in 1960. They examined problems of drilling down to 10 000 m.

They planned the construction of wells for these conditions, and selected the pipes, flushing fluids, and main and auxiliary drilling equipment.

The use of tubes made of light alloys will be very important for drilling down to 10 000 m. Experiments with light-alloy drill pipes were made by Kuibyshev NII NP in conjunction with VNIIBT in the Pervomaiburneft ("First of May" Oil Drilling) Trust in the Kuibyshev Council of National Economy in drilling down to 2500 m. They showed a great saving of time in lowering and raising operations. In view of the high bottom-hole temperatures and also the big loads on the lifting gear, ligh-alloy, thermo-stable, corrosion-resisting materials are needed for the new designs of pipes and their screw joints.

These problems need great attention from VIAM (All-Union Institute for Aviation Materials) UkrNITI and other organizations, in addition to the new pipe and screw joints section of VNIIBT.

As drilling depths increase, the problems of bottom-hole control of drilling parameters become more acute. VNIIBT has developed and produced bottom-hole automatic controls for bit feed, actuated by variation in the pressure on the turbodrill and by variation in the torque on the bit. Preparatory bench tests of these automatic controls at VNIBT and KF VNII are now in hand.

First tests have confirmed the practicability of the kinematic arrangement of the automatic control actuated by pressure.

A turbo-tachometer with a hydraulic line of communication has been developed by VNIIBT and successfully tested at Baku at a depth of 2400 m. Work is being done on the production of an experimental batch of turbo-tachometers for extensive trials under different conditions.

There is a group of research projects which are of great importance for improving the efficiency of deep drilling. They are concerned with studying the state of stress in the bottom-hole zone resulting from the combined pressure of the formations and the hydraulic pressure, and also the effect of pressure in the pore space on the mechanics of the breaking of rock.

In order to carry out this research VNIIBT has developed a plan and begun the construction of a test bed for drilling with micro-bits with pressures up to 1000 atm in the medium. At the same time preparatory work is being done on the development of a test bed for drilling with 5-6" bits, also at pressures up to 1000 atm.

At the same time as this work on the high pressure test beds, VNIIBT has developed a method for investigating pressures in the bottom-hole zone by photo-elastic methods on models made of optically active materials.

In drilling under complicated conditions at great depths, experience in the USSR and abroad shows that problems of preventing and curing the sticking of the tool are acute. In this connexion, work has been done on determining the causes of this phenomenon,

and values have been determined for the hydrostatic pressures needed for finding the pressure drop in the zone in which sticking has occured. Figures have been obtained for coefficients of friction and adhesion of the shell of the mud wall of the hole when paired with a steel surface (for pressure drop up to 50 atm and for the effect of the figures of additions to the fluid of graphite, petroleum, sand and salt).

VNIIBT handed over bits of eight type sizes for series production in 1960.

The main task in the bit field is the development under test-bed and field conditions of bits with lubrication both of the sealed and the flow type. Improvement of the quality of bits will be greatly affected by the criteria that have been developed for the selection of steel for bosses and cutters. A big research programme on this has been carried out by the Metal Science Section of VNIIBT. In addition to the standard mechanical properties of steels, the criteria give standards for strength properties which take account of impact-fatigue strength, and wear resistance in rolling and sliding friction in an abrasive enviroment.

As a result of these big research works, new specifications are now being developed for the supply of steels for bosses, cutters and rollers, for hard-alloy inserts and hard facing and for the heat treatment of components of bits.

Active adoption of the new specifications and re-equipment of factories to suit them will promote a distinct rise in the performance figures for bits and an improvement in their quality.

A large amount of work has been done on the examination and synthesis of suitable reagents for stabilising and adjusting the

properties of flushing fluids under drilling conditions with high temperatures and high degrees of mineralization in the underground waters.

This work disclosed new laws governing the behaviour of drilling fluids under high temperature conditions. Several specifications were selected for fluids for these conditions.

Gipan (aqueous dispersion of polyacrylonitrile) gave good results as an active agent and stabilizer. It was established that in fresh-water fluids UShchR and KSSB can ensure thermostability, and that PFLKh (a polyphenol from the wood chemical industry) can do so when used as a viscosity-reducer. Effective reduction of viscosity is achieved with OF-30 (polyoxyethylized phenol).

Work is going on in VNIIBT on the creation of the following new methods of drilling: drilling by blasting without a bit, vibrodrilling, and drilling without raising the drill string. In spite of the time this work has been going on, it is still far from completion.

Encouraging test-bed trials have been made with the AK-5 ampoule with a partial directional blast. Trials in 1961 will show how far this ampoule under operating conditions, i.e. at a depth of 2500 m, will solve the problem of increasing the penetration per single explosion, and reduce the volume of the slurry formed and the diameter of the hole.

Drilling with experimental designs of vibrodrills produced satisfactory results in 1960 in Bashnefterazvedka (Bashkir Petroleum Prospecting Board) in drilling exploratory holes using water. The task of confirming the results has been set for 1961.

Satisfactory results in drilling without raising the drill string were obtained in 1960. Two designs of mechanism for retractable bits operated without failure during the lives of dozens of bits. This enabled the Saratov Council of National Economy to plan the drilling of an experimental hole to 2200 m by this method in 1961.

The prospects of the method of drilling in which bits are changed without raising the drill string are attractive, particularly in combination with light-alloy pipes for deep holes. But the problem is a complicated one, and still needs a large amount of experimental and design work before it is adopted extensively in drilling practice.

Research and design organizations working in the field of drilling are at present under an obligation to industry in regard to the creation of high-torque small-size bottom-hole prime movers, lighter drilling outfits, pumps and blowout preventers. And it is necessary to declare claims against our industry, which is holding up the taking in hand and production of a number of items for which designs have been completed and specifications and manufacturing processes have been tested.

Such items are: drill pipes, heavy-weight pipes and casing with a yield point of 70-75 kg/mm and reinforced threads, powerful, lightened drilling rigs, the new PFLKh, OP-I, gipan and KSSB reagents for treating drilling fluids, jet bits with replaceable nozzles, high pressure hoses and so on.

There is no doubt that the combined efforts of the many research organizations that are working on drilling projects will very soon wipe out their indebtedness in the solution of problems of deep drilling.

REPORTS ON VISITS

The following published and unpublished reports on visits have been received in the National Lending Library for Science and Technology, Boston Spa, Yorkshire. Further lists will be published in the NLL Translations Bulletin from time to time and readers are invited to deposit copies of any similar published or unpublished reports they may have made in the Lending Library Unit.

EDUCATION

DERTHICK, L. G.: "Soviet Commitment to Education: Report of First Official US Education Mission to the USSR", Bulletin 1959, No. 16, US Department of Health, Education and Welfare, Washington D. C.

(An 8-man team visited the USSR from May 8th to June 6th, 1958. Institutions visited include in Moscow: the University, the Lenin Institute Hostel, the Ministry of Higher Education, Labour Reserve School No. 1, resource and Training Centre for Scouting and Nature Study, the Central School of Young Technicians, a school for the blind, a general school in an industrial area and a boarding school. In Leningrad: a general school, the University, Medical School No. 14, the Institute of Art, Sculpture and Architecture, a Light Industry Technicum, the Ballet

School, the School for Working Youth No. 15, and the Central Pioneer Palace. In Minsk: the Minsk Power Technicum, (students are prepared for 5 different parts of power industry), the Music school, a Childrens' Library, and a Kindergarten. In Kazan: the University, Kazan State Pedagogical Institute, and a Kindergarten. In Sverdlovsk: Gorki University, the Pioneer Palace, the School for Working Youth No. 11, and a Kindergarten sponsored by Urals Machine Building Plant. In Alma-Ata: Kasakh University, an experimental Plan 3 school (part of the students time is spent in industry). In Tashkent: the University, and a general School. Special language schools were also discussed, and numerous meetings were held with the Academy of Sciences, the Academy of Pedogogical Sciences and lesser Institutions).

NLL shelf mark: V 108

CHEMISTRY

WATERS, W. A.: "Report on a Visit to the USSR: March 11th to 25th, 1961". Unpublished report by author at Balliol College, Oxford.

(Institutions visited include, in Moscow: the University, the Institution of Fundamental Organic Chemistry, the Institute of Chemical Kinetics, in Leningrad: the University, the Institute for High Polymer Research, Chemistry Department of the University. During his visit the author gave several lectures).

NLL shelf mark: V 9

BIOLOGY

ANON.: "Extract from a Report of a Visit to Czechoslovakia in August 1960". Unpublished report.

(Institutions visited in Prague include: The Hydraulics Research Institute, Institute of Hygiene - sewage works, Charles University, Hydrobiological Station (Field station at Blatna in South Bohemia) Charles Institute, Institute of Entomology: Institute of Hydrobiology. Academy of Sciences (H.Q. in Prague): at Vodnary the Ministry of Agriculture and Fisheries Research Station: at Brno - the University - Department of Zoology: at Olomouc - the University, Department of Zoology. This report notes the main interests of each of the institutions visited).

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AGRICULTURE

CROMPTON, A.: "A Visit to the USSR: 27th September to 18th October, 1960". Unpublished report by author at Soil Survey of England & Wales, c/o NAAS, Government Bldgs., Lawnswood, Leeds 16, Yorkshire.

(Institutions visited include: in Moscow: the Scientific Research Institute of Crop Husbandry, the Ministry of Agriculture, the Exhibition of the Economic Achievement of the USSR, the Dokuchaiev Soil Institute of the Academy of Science, Moscow State University Biology - Pedology Faculty, Museum of Soil Profiles, the Williams Soil Museum, the All-Union Scientific Research Institute of Fertilizers and Agro - Pedology, in Leningrad: Dokuchaiev Soil Museum, the North Western Agricultural Research Institute, the Agricultural

Department of the Leningrad region, in Kiev: the Agricultural Academy, and the Academy farm. The report includes details of methods of soil analyses, and farming policy).

NLL shelf mark: V 69

MARKHAM, R.: "Report on my visit to the USSR". Unpublished report by author at Agricultural Research Council, Virus Research Unit, Huntingdon Road, Cambridge. (Report on visit in March 1961. Institutions visited include, in Moscow: the Agricultural Academy, the University, the Bach Institute, the Molecular Biology Institute, the Academy of Medical Virusology, the Academy of Genetics and a Collective Farm near Moscow, in Leningrad: the Institute of Plant Industry. During his visit the author gave several lectures and discussed common problems of research with Russian scientists).

NLL shelf mark: V 17

N. L. L. LOAN COLLECTION OF TRANSLATIONS

The loan collection includes microfilm copies of all Russian translations held by the Special Libraries Association of America at the John Crerar library. These were listed originally in the "Bibliography of Translations from Russian Scientific and Technical Literature", 1953-1956, issued by the Library of Congress, Washington, then in "Translations Monthly" Vols. 1-4, 1955-1958, issued by the John Crerar Library, Chicago. Current S. L. A. accessions are listed in "Technical Translations", issued by the Dept. of Commerce, Office of Technical Services, Washington 25, D. C., subscription price $16.00.

In addition to the accessions from the S. L. A. Centre, N. L. L. has received currently the translations listed below.

All translations held in the loan collection are available to organizations which are approved borrowers from the Science Museum Library, provided loan requisition forms issued by that Library are used. These forms should be sent direct to National Lending Library for Science & Technology, Boston Spa, Yorkshire, and any correspondence about them should be sent to that address.

Organizations which do not borrow from the Science Museum Library, but wish to borrow literature from N. L. L., should write to the Keeper, Science Museum Library, London, S. W. 7., and request to be considered for the Science Museum Library's list of approved borrowers.

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Stal' in English 1961 (7) published in October 1961 contains an article on the calculation of the contact surface between the metal and rolls during piercing. The equations, which are evolved, for calculating the width of contact surface, by taking into account the ovalness of the rolls and deviations in rate of feed, give more accurate results than those previously achieved.

Stal' in English 1961 (8) published in October 1961 includes a paper on the use of oxygen to burn the carbon-monoxide evolved from the bath of an open-hearth furnace in order to attain better heat economy.

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AGRICULTURE

USSR State Standards - Food Grains

An official document of the USSR, published in Moscow, 1959. The official Soviet standards for many varieties of grain and some grain products are given.

224 pages $8.00 56s.

The Resistance of Agricultural Plants to Pests

By P. G. Chesnokov. Published by the All-Union Society for the Dissemination of Political and Scientific Information, Leningrad, 1955.

30 pages; illustrated $2.00 14s.

Methods of Studying Pest Resistance in Plants

By P. G. Chesnokov. Published by the State Publishing House for Agricultural Literature, Moscow, 1953.

The author describes what methods of research are needed in order to develop plants giving heavy yields, and having a high resistance to parasites. The book gives complete theoretical and experimental data.

131 pages; fully illustrated $5.00 25s.

BIOLOGY

The Importance of Nucleic Acids in Biology

By O. P. Chepinoga. Published by the Academy of Sciences of the Ukrainian SSR, Kiev, 1956.

A full description of nucleic acids together with data on their influence on biological processes. Special attention is accorded to the metabolism of nucleic acids in organisms when influenced by external and internal factors.

163 pages; illustrated $6.00 42s.

BOTANY

Flora of the USSR

The Program for Scientific Translations is undertaking the translation of several volumes of this standard reference work of Flora of the USSR. Details of the first volume to be translated appear below, and later volumes will be announced nearer the date of publication.

Volume II Cereals - family Gramineae Juss.
There are appendices of Species, Latin names and a reference guide to species.

778 pages; fully illustrated $15.50 110s.

ELECTRONICS

Application of the Probability Theory and Mathematical Statistics in the Design and Production of Radio Equipment

By P. P. Mesyatsev. Published by the Academy of Sciences of the USSR.

This book describes how the theory of probability and mathematical statistics may be applied to the production of radio equipment. The author includes numerous examples of practical applications of his theories.

262 pages; illustrated $9.00 63s.

FORESTRY

Shelterbelt Forestry

A collection of ten articles selected from various journals describing various aspects of the problems, the role and importance of shelterbelts as a protection against erosion.

76 pages; illustrated $3.00 21s.

HYDROLOGY AND HYDRAULIC ENGINEERING

Movement of Water at the Bend of an Open Channel

By I. L. Rozovskii. Published by the Academy of Sciences of the Ukrainian SSR, Kiev, 1957.

The results of theoretical and practical research on the influence of water at the bend of an open channel. The effect of transverse circulation on various types of river beds is discussed.

187 pages; fully illustrated $6.00 42s.

LIVESTOCK

Collection of Works (Sbornik rabot) of the All-Union Institute of Experimental Veterinary Medicine

Published in Moscow, 1957.

153 pages; fully illustrated $6.00 42s.

MATHEMATICS

Theory of Algorithms

By A. A. Markov. Published by the Academy of Sciences of the USSR, Moscow, 1954.

From the Proceedings (Trudy) of the V. A. Steklov Institute of Mathematics, 1954 42

374 pages; illustrated $11.00 77s.

MEDICINE

Medical Safety Measures in the Event of Mass Attacks on Population

By L. F. Supron and F. P. Zverev. Published by the State Publishing House of the Belorussian SSR, Minsk, 1959.

This is a series of lectures delivered at the Belorussian Medical Institute. It is a systematic discussion of the medical and tactical measures to be taken in cases of atomic or bacteriological mass attacks, and ways and means of ensuring their success. Symptoms and treatment of infections, such as radiation sickness, etc., are explained, and examples are drawn from actual practice. The book will be invaluable to all medical research institutes, military medical personnel, and government departments and institutions.

356 pages; fully illustrated $11.00 78s.

Applications of Radio-Isotopes to Clinical and Experimental Research

By Prof. V. K. Modestov. Published by the Ministry o. Public Health of the USSR, Moscow, 1958.

A collection of papers on the uses of radio-isotopes as tracers in the investigation of metabolic processes, and in therapy, written by some of the foremost radiologists and specialists of medical institutions of the USSR.

210 pages; fully illustrated $8.00 56s.

Evoluntionary Regularities as Reflected in the Epileptiform Reaction of Animals to High Partial Oxygen Pressure

By A. V. Voino-Yasenetskii. Published by the Academy of Sciences of the USSR, Moscow, 1958.

An elucidation of the phenomena of the spastic, epileptic, and symptomatic complex from the evolutionary aspect. The book will be of considerable use to physiologists, biologists and physicians; in addition to this, the practical applications of this book will be invaluable to personnel connected with diving and deep sea operations, and to research workers on problems of space and rockets.

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The Neoplastic Process and the Nervous System

Published by the State Medical House, Kiev, 1958.

A complete analysis of prophylaxis and treatment of neoplastic diseases, incorporating the results of many years experience and experimental research on the role of the nervous system in the development of malignant tumours.

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Iodine Metabolism and Thyroid Hormones

By Ya. Kh. Turakulov. Published by the Publishing House of the Uzbek SSR, 1959.

A complete study of the biochemistry of the thyroid gland giving a survey of all extant literature and postwar research, this book deals with iodine metabolism, hormone and thyroxin formation, and all problems of physical, chemical, and pharmacological influence on normal and pathalogic glands.

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Problems in the Study of Higher Neurodynamics as related to Psychology

Published by the Publishing House of the Academy of Pedagogical Sciences, Moscow, 1957.

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256 pages; illustrated $9.00 63s.

Problems (Voprosy) of Psychiatry and Neuropathology

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Edited by M. G. Anan'ev. Published by the Ministry of Public Health of the USSR, Moscow, 1958.

Two volumes containing a series of articles on new surgical devices, materials used in their construction, and the experience of surgeons who have used them in actual practice. The work shows the results of the co-operation of technical research departments with the experience of surgeons. Both volumes are fully illustrated.

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METALLURGY

Brazing and Soldering of Metals

By N. F. Lashko. Published by the State Publishing House for Theoretical Technical Literature, Moscow, 1959.

A full description of physico-chemical processes that occur during brazing and soldering. Various methods of soldering and types of solders are discussed, taking into account the metals to be joined.

442 pages; fully illustrated	$12.00	84s.

Corrosion Cracking of Metals

By V. V. Romanov. Published by the Academy of Sciences of the USSR, Moscow, 1960.

This book gives a full description of the cracking of metals due to stress corrosion, and describes ways in which it may be combated. The author draws freely from his own researches in the subjects as well as from foreign literature. The book will be of great value to metallurgists, engineers, chemical technologists, and all those who constantly face problems of corrosion.

177 pages; illustrated	$6.00	42s.

Theory of the Heat Resistance of Metals and Alloys

By K. A. Osipov. Published by the Academy of Sciences of the USSR, Moscow, 1960.

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Cast Fused Refractories

By A. A. Litvakovskii. Published by the State Publishing House for Literature on Building and Construction Materials, Moscow, 1959.

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METEOROLOGY

Methods of Weather Forecasts for 3 to 7 days

By Yu. B. Chabrov. Published by the Central Institute of Weather Forecasting, Moscow, 1959.

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PALEONTOLOGY

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A Key to Parasitic Nematodes: Strongylata

Compiled by Prof. K. I. Skryabin and others. Published by the Helminthological Laboratory of the USSR Academy of Sciences, Moscow, 1959.

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By P. F. Konovalov, A. I. Efremov, and B. V. Volkonskii. Published by the Society of Science and Engineering of the Construction Materials Industry, Moscow, 1958.

The design and construction of X-Ray-analysis equipment and its application to the analysis of construction materials.

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Thin Walled Elastic Beams

By V. S. Vlasov. Published by the State Publishing House for Literature on Mathematics and Physics, Moscow, 1958.

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By V. V. Novozhilov. Published by the State Publishing House for the Ship-Building Industry, Moscow, 1958.

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590 pages; fully illustrated $13.50 95s.

Serozems of Southern Asia

By A. Rozanov. Published by the Academy of Sciences of the USSR, Moscow, 1951.

A complete and concise study of the subject, written by the leading expert in the field. The volume represents the culmination of many years extensive work and experience. Due to the relative obscurity of the vast regions under discussion, the book is of paramount importance.

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Fauna of the USSR: Predatory Mammals of the USSR

By S. A. Novikov. Published by the Academy of Sciences of the USSR, Moscow, 1959.

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Fauna of the USSR - Birds: Family Alcidae

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"The Chinese Coal Industry" Part I, published by Joseph Crossfield & Sons Limited, Bank Quay Works, Warrington, Lancashire. July 1961. 172 pages unpriced.

This is the first part of a comprehensive survey containing information on the background of the industry, its economics, organization and geographical distribution. It is based on Chinese and Soviet Sources of information and is probably the first extended account to appear in English of an individual Communist Chinese Industry.

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1955 101(4) 727-730 7s. 6d.

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RTS 1927. Construction of foundations above the depth of freezing for houses with a restricted number of storeys.
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TRUDY URAL'SKOGO POLITEKHICHESKOGO INSTITUTA IM. S. M. KIROVA (Transactions of the Kirov Politechnical Institute of Ural)

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1957 58 128-144 40s.

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(Ukrainian Botanical Journal)

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1960 17(1) 12-18 17s. 6d.

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